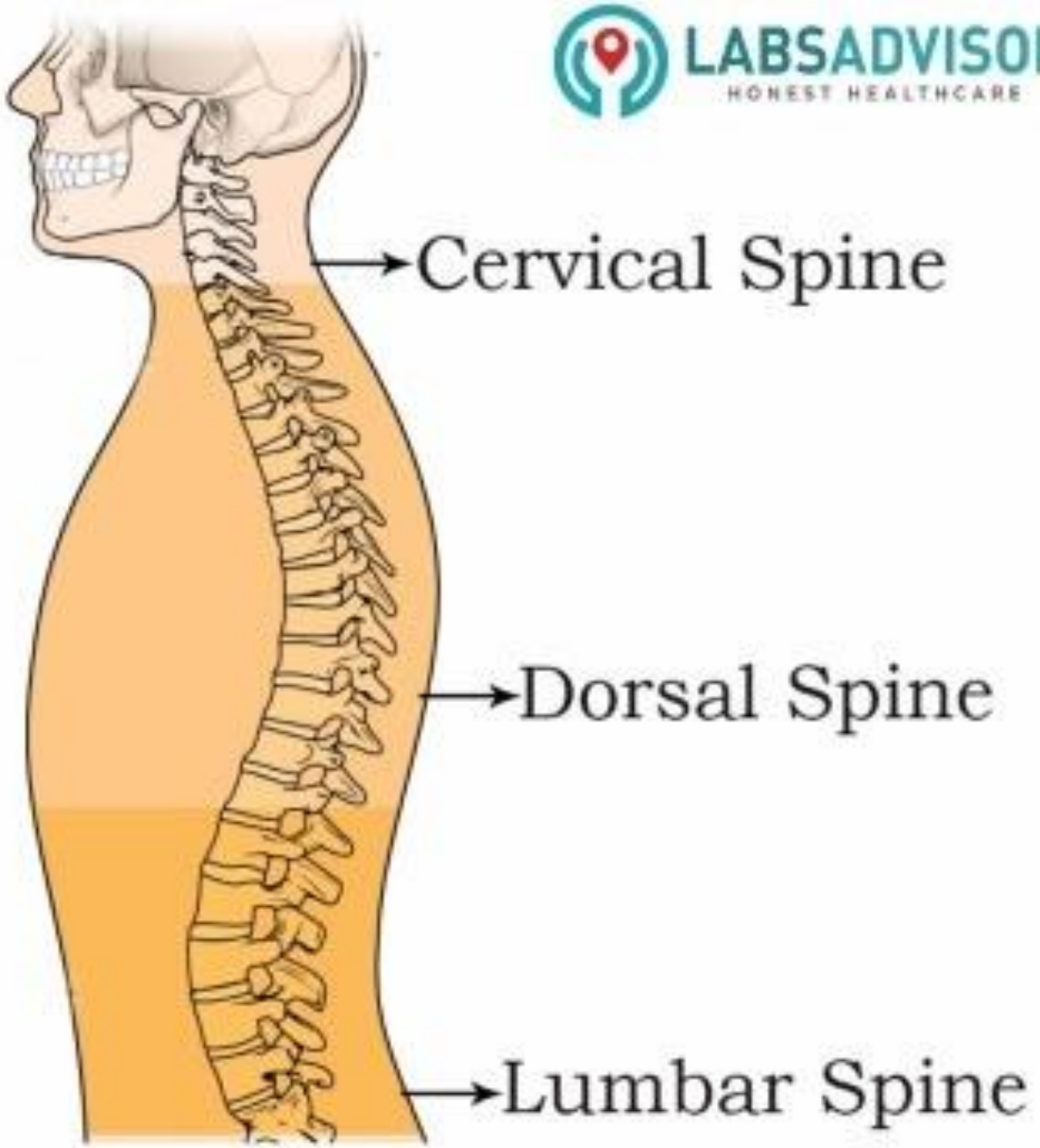
MRI SPINE



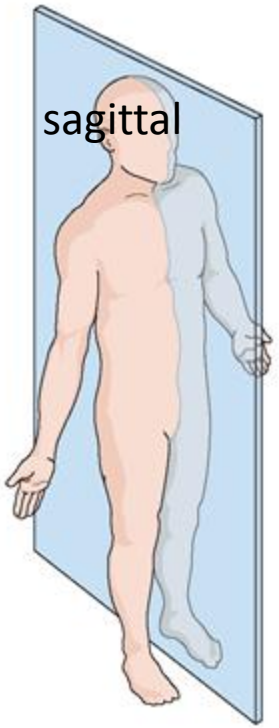
Muhammad Shahidullah Shamol
FCPS (MEDICINE)

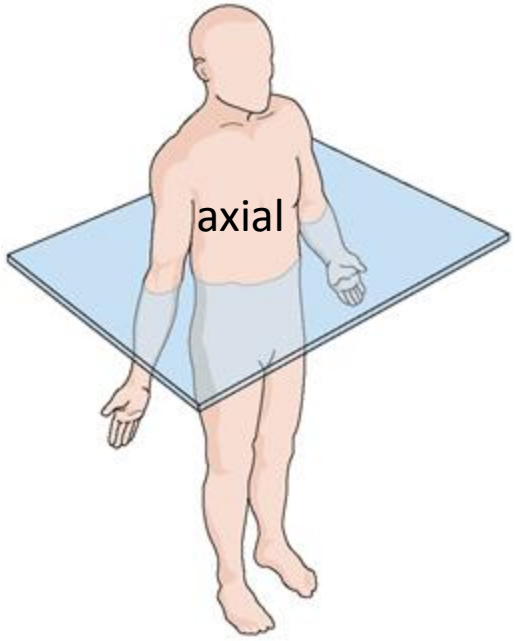
MRI of spine




LABSADVISOR
HONEST HEALTHCARE
Cervical Spine
Dorsal Spine
Lumbar Spine

In MRI spine **You will get 4 films**	**2 sagittal films**	**T1**
		T2
	2 axial films	T1
		T2

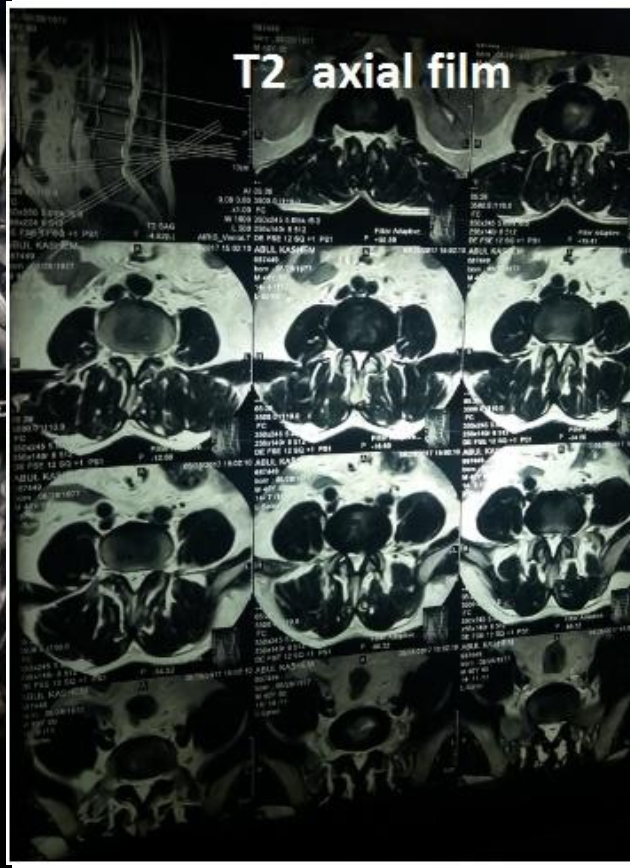


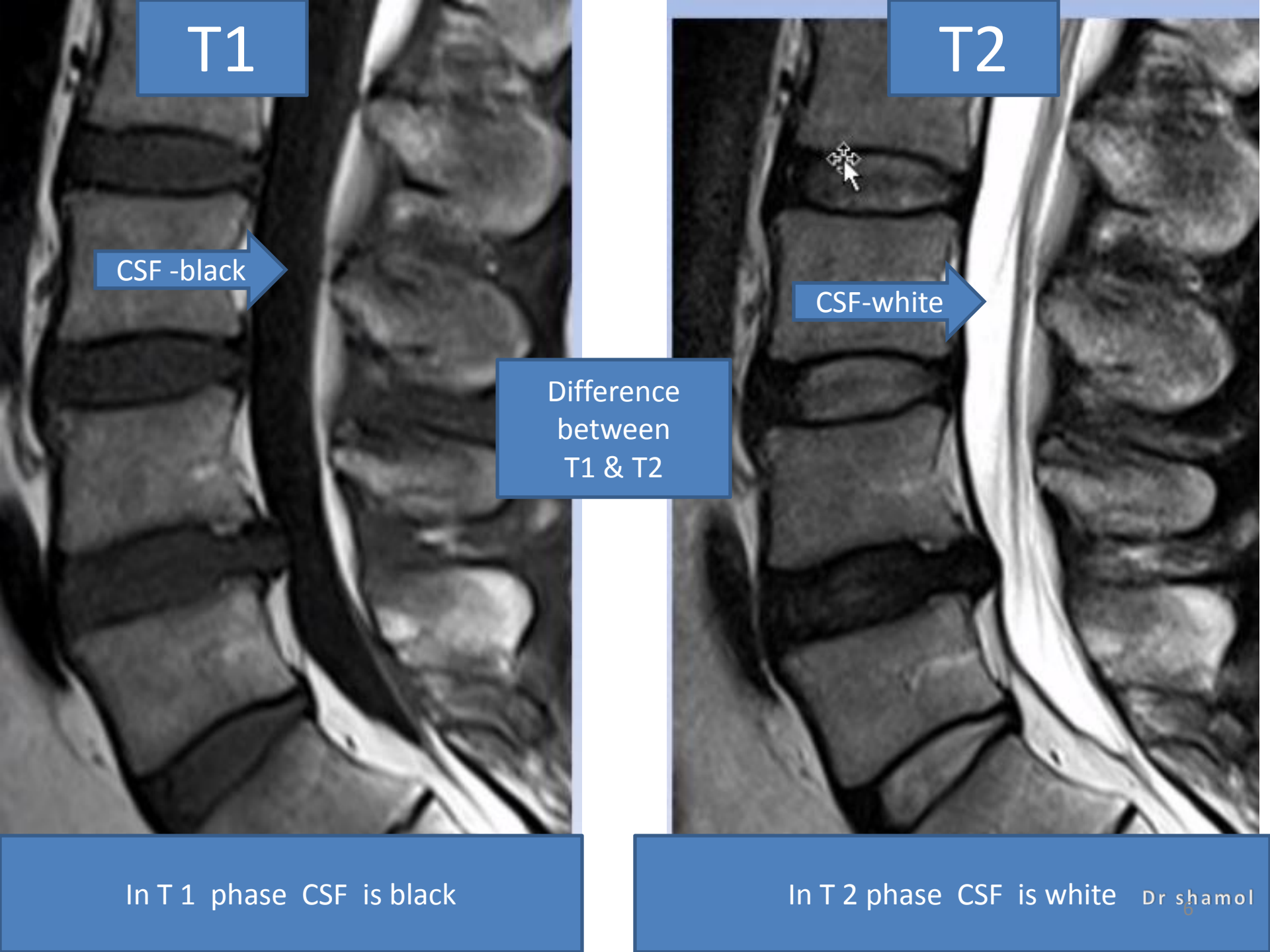


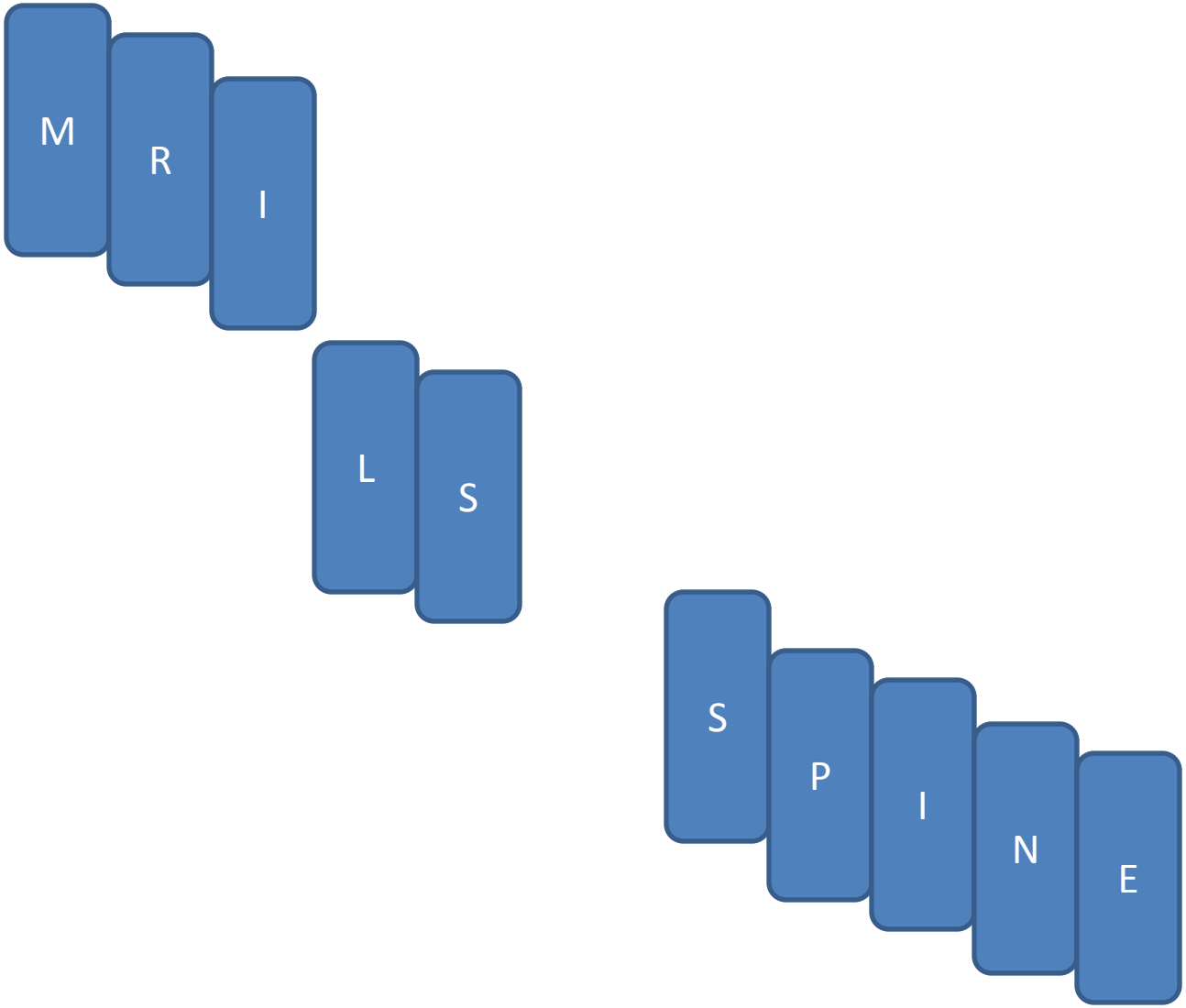
hamol


T1 sagittal


T2 sagittal
Dr shamol

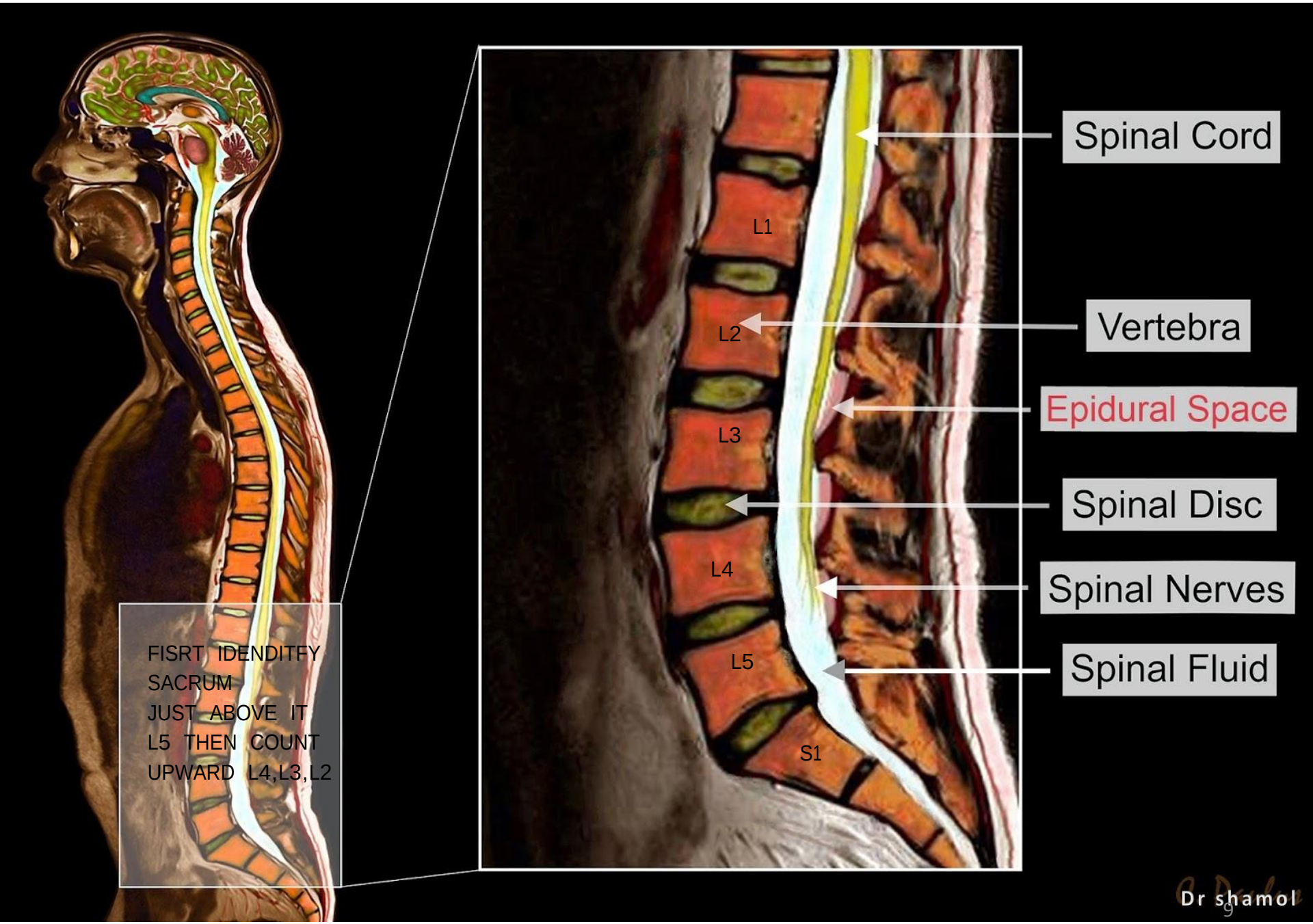

T2 axial film


T1
CSF -black
T2
CSF-white
Difference between T1 & T2
In T 1 phase CSF is black
In T 2 phase CSF is white
Dr shamol


M
R
I
L
S
S
P
I
N
E

Section: 1

anatomy


Spinal Cord
Vertebra
Epidural Space
Spinal Disc
Spinal Nerves
Spinal Fluid
L1
L2
L3
L4
L5
S1
FISRT IDENDITFY
SACRUM
JUST ABOVE IT
L5 THEN COUNT
UPWARD L4,L3,L2
Dr shamol

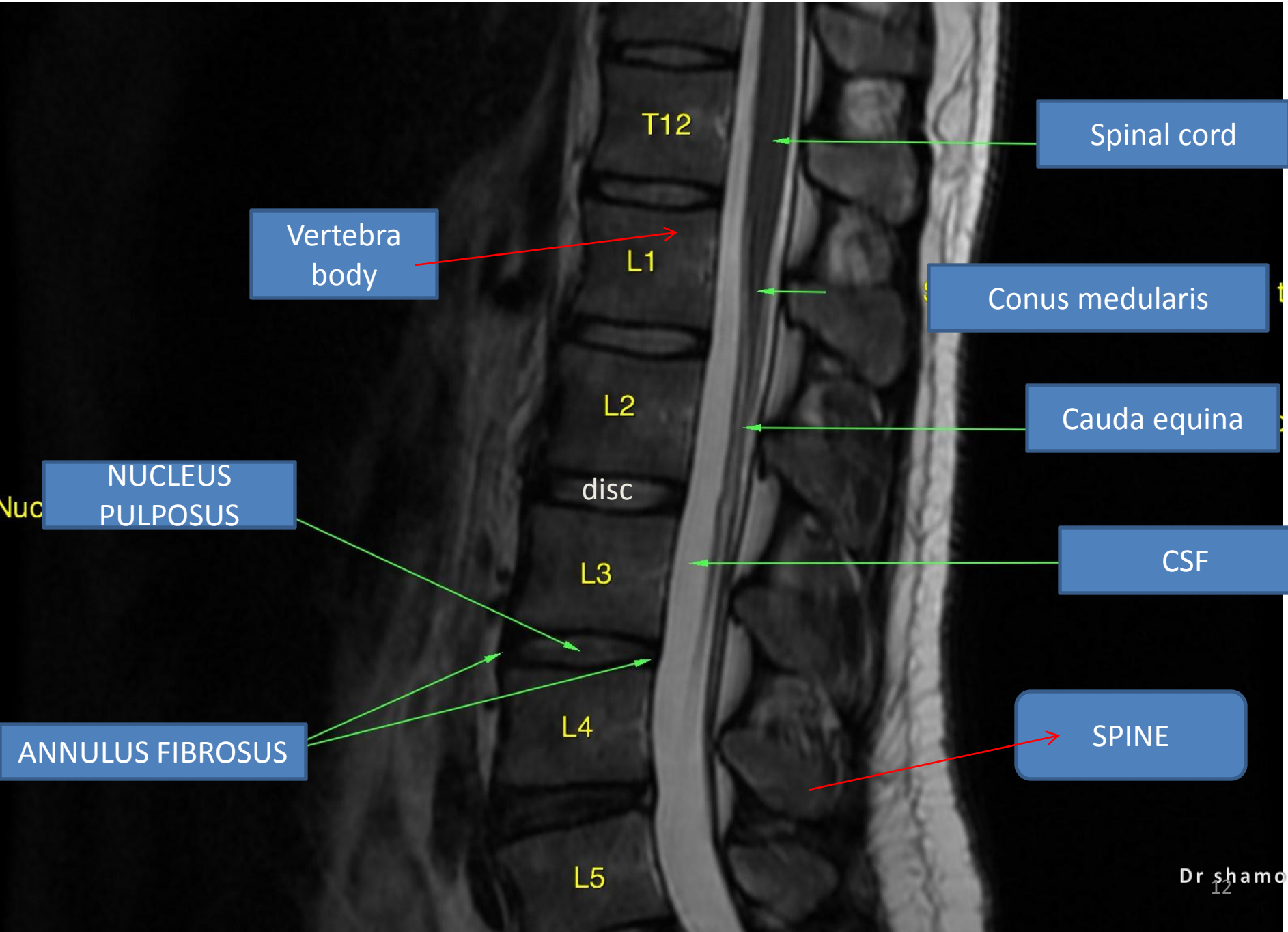


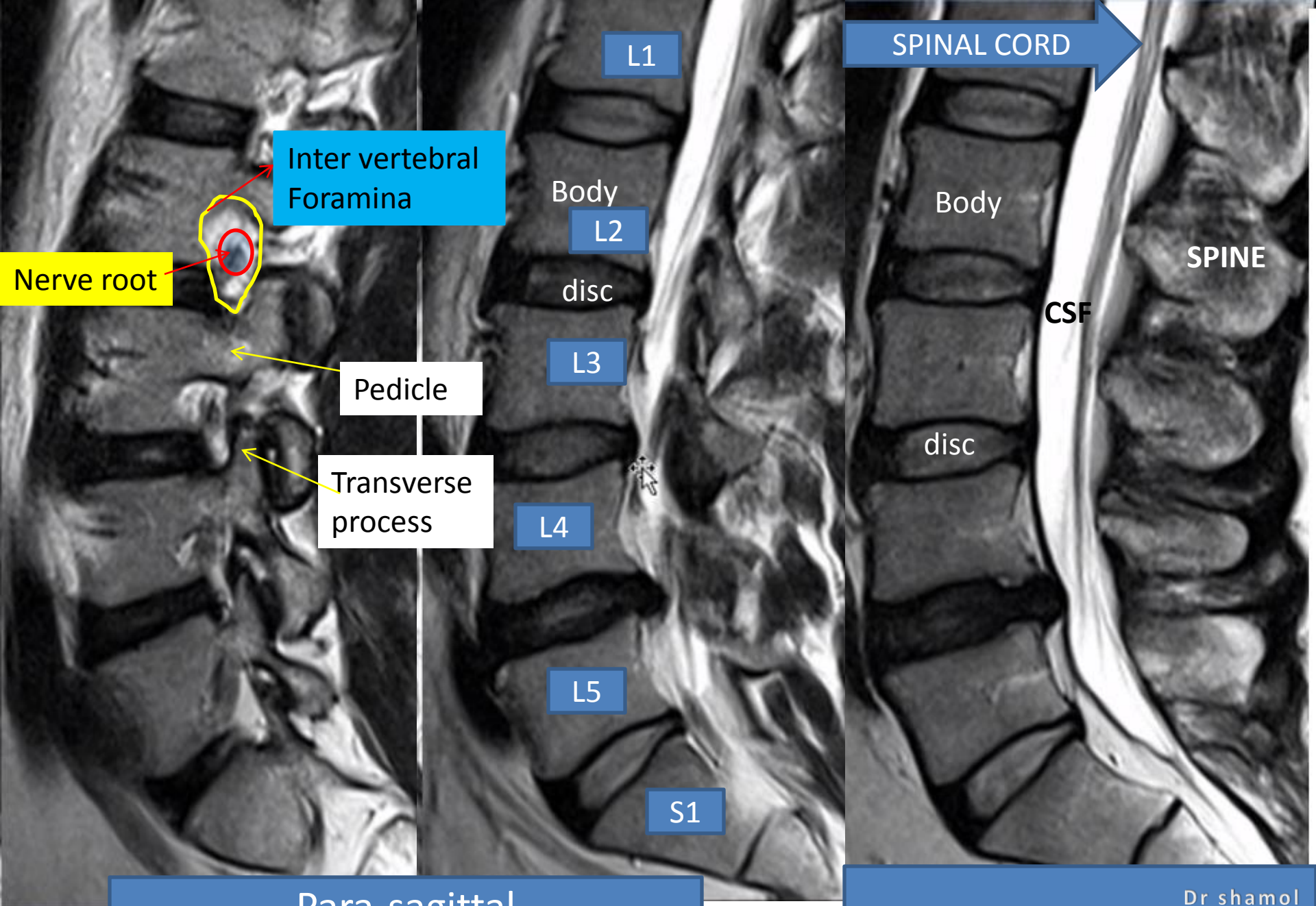
In a sagittal film there are many windows
Largest window is mid sagittal section

Others small windows for para-sagittal section

MAJOR STRUCTURE IN LS SPINE

Dr shamol


T12
L1
L2
disc
L3
L4
L5
Spinal cord
Vertebra body
Conus medularis
Cauda equina
NUCLEUS PULPOSUS
CSF
ANNULUS FIBROSUS
SPINE
Dr shamol


Inter vertebral Foramina
Nerve root
Pedicle
Transverse process
L1
Body
L2
disc
L3
L4
L5
S1
SPINAL CORD
Body
SPINE
CSF
disc
Para-sagittal
Mid -sagittal
Dr shamol
13

Para sagittal TW2



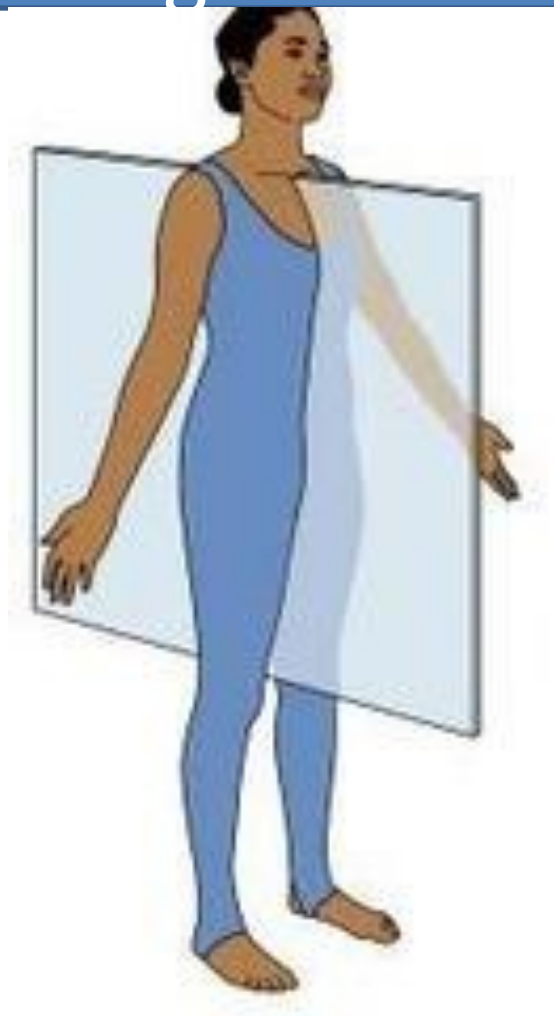
Inter vertebral Foramina

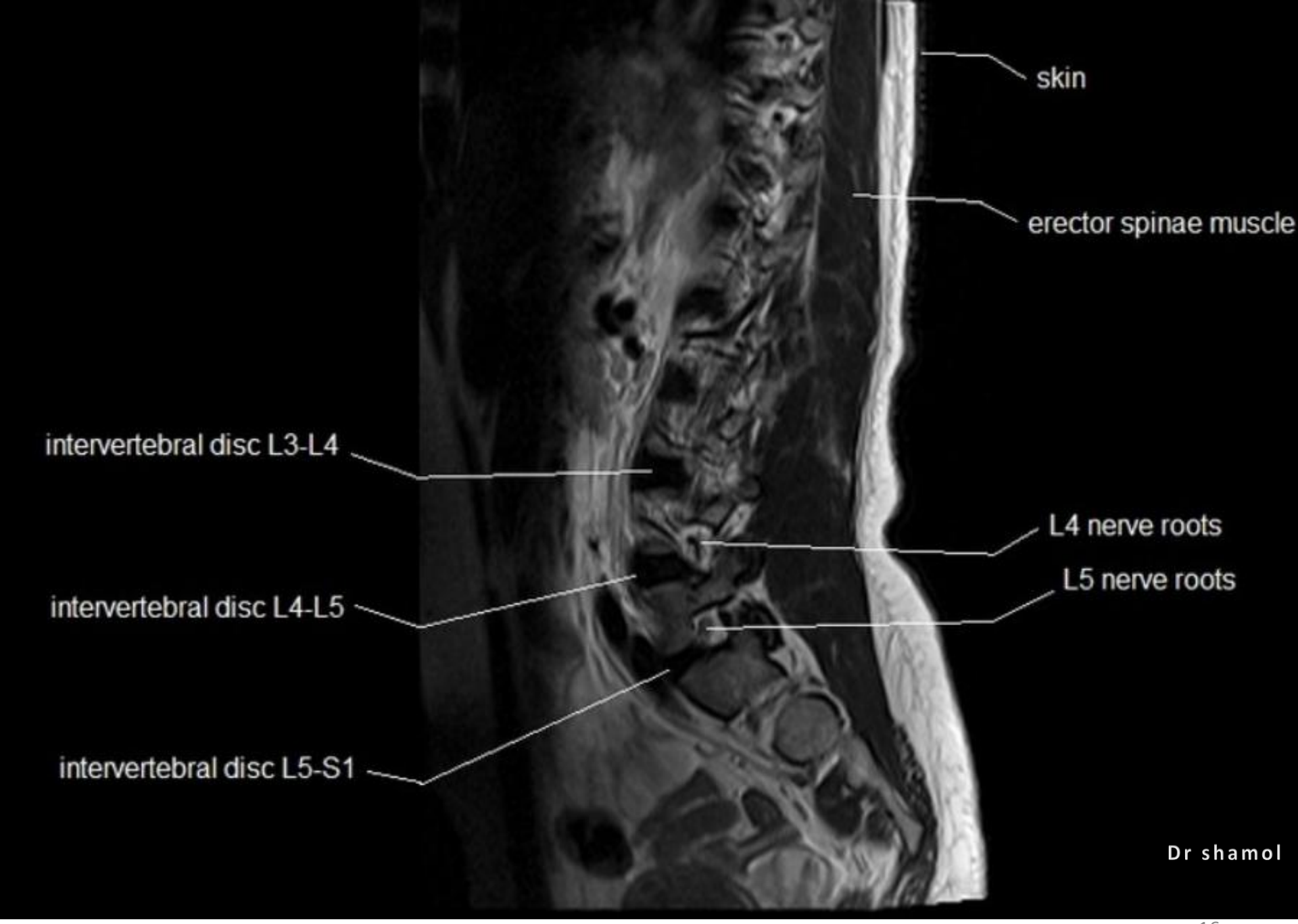
Nerve root

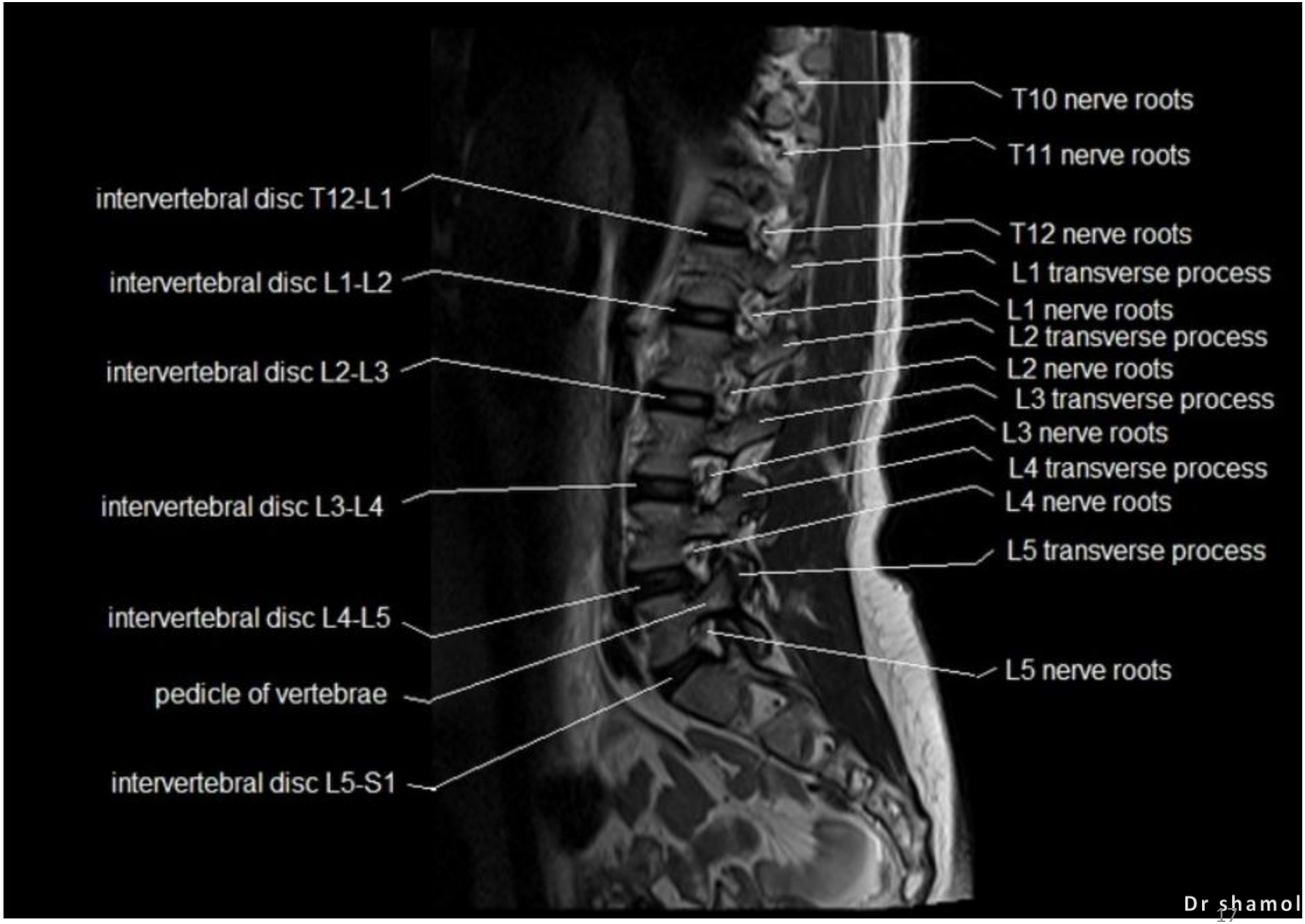
Black tunnel in white are The nerve roots

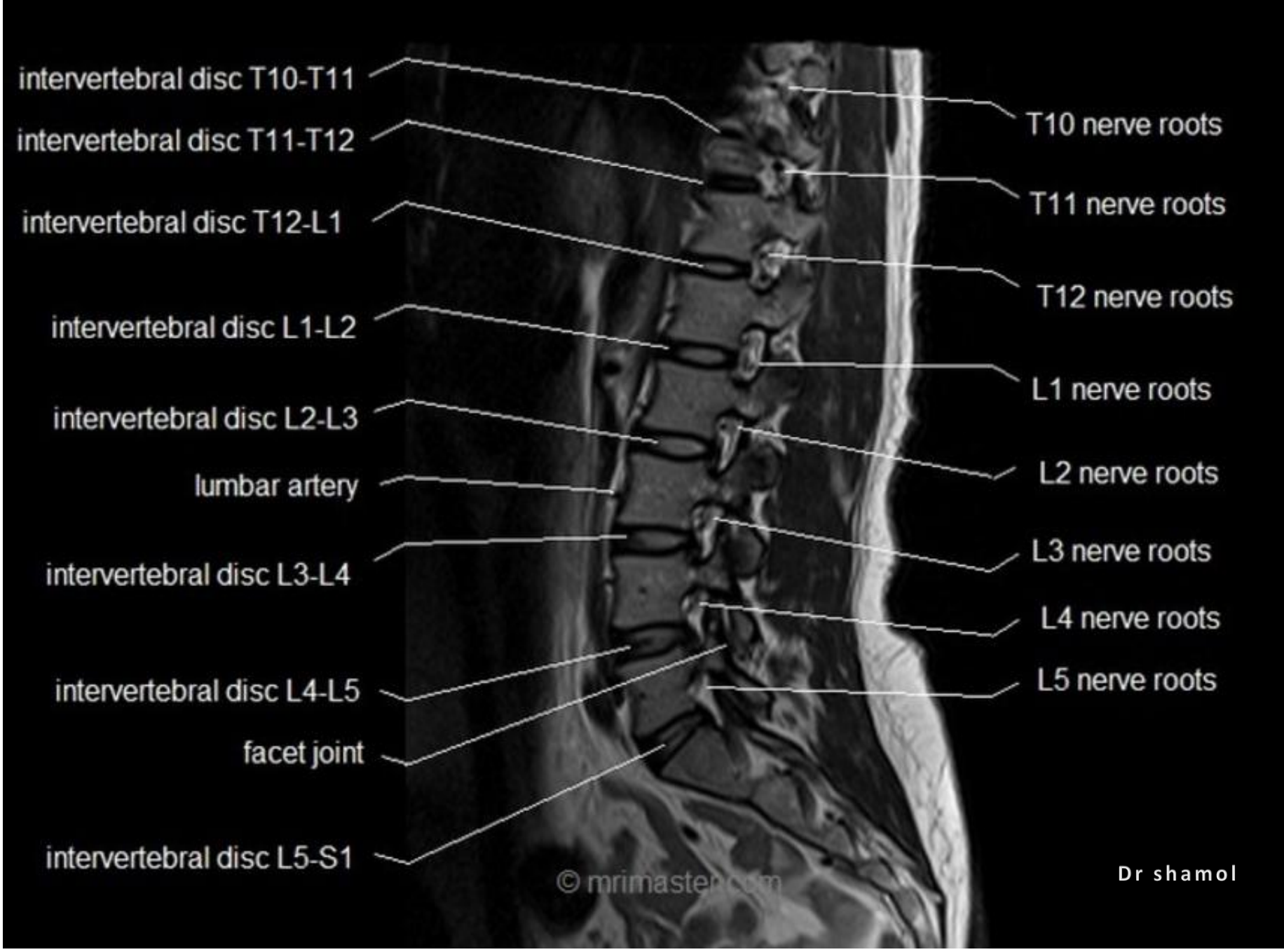
Dr shamol

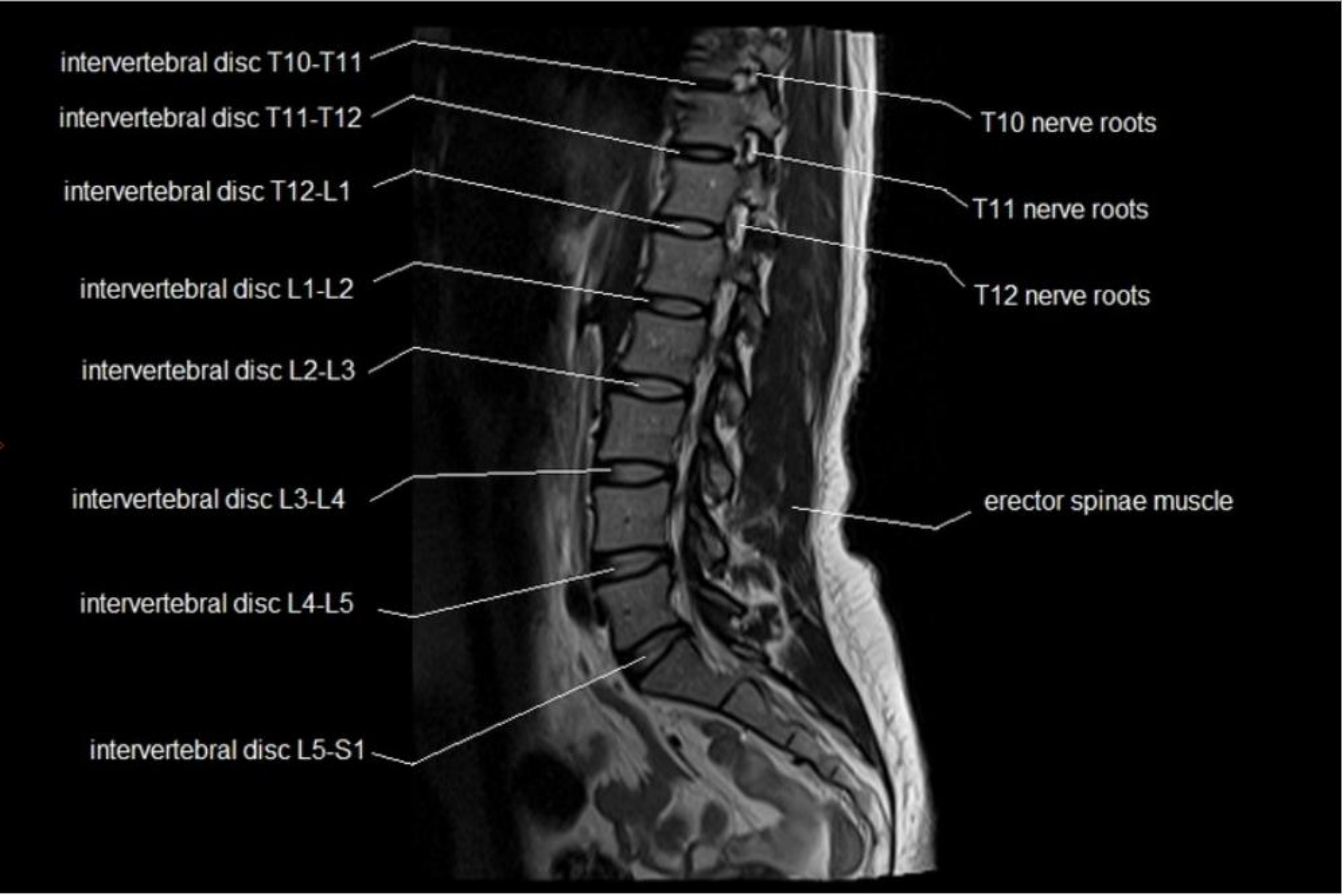
Sequence of sagittal section film one by one From right to left side

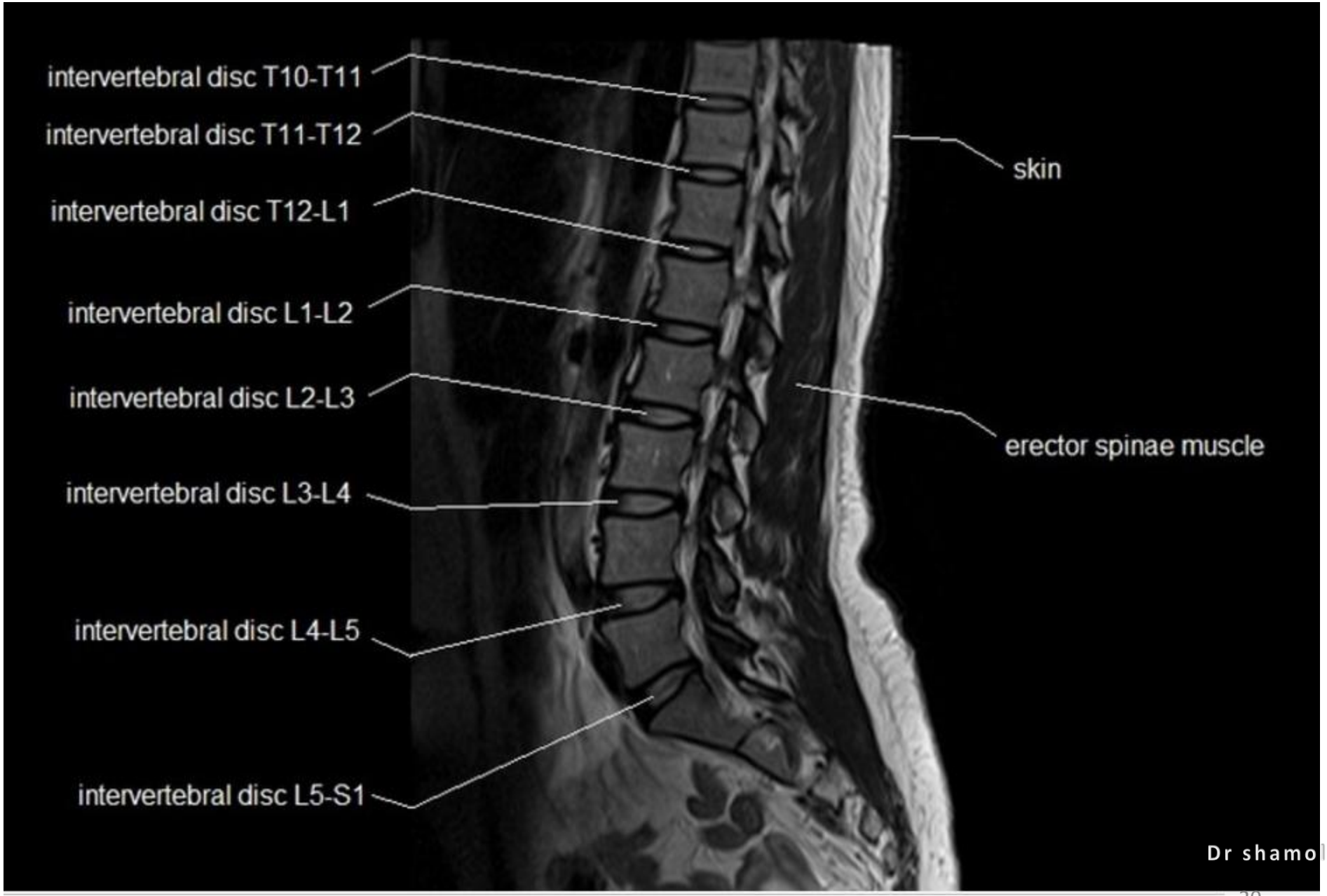


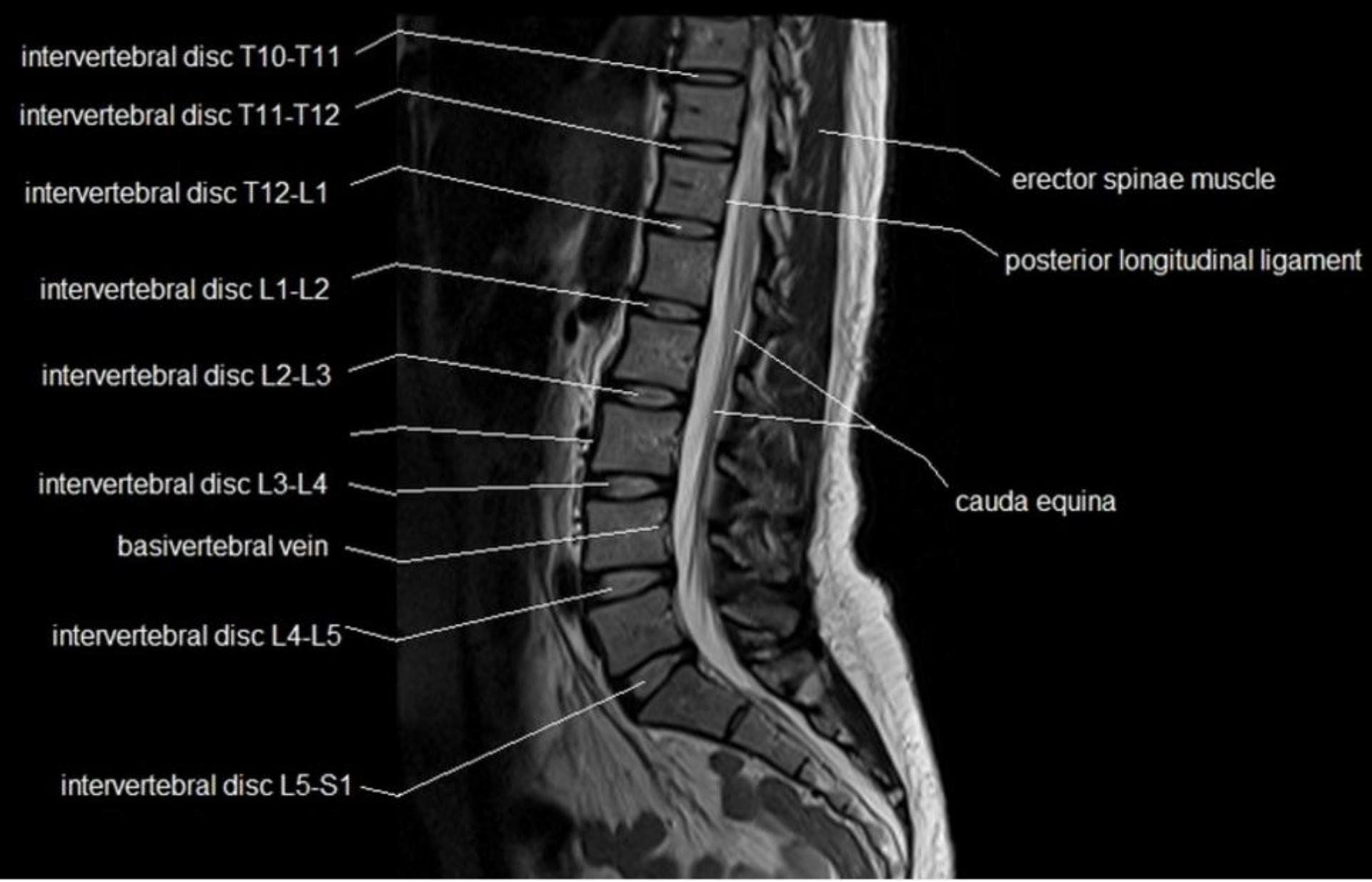

skin
erector spinae muscle
intervertebral disc L3-L4
L4 nerve roots
L5 nerve roots
intervertebral disc L4-L5
intervertebral disc L5-S1
Dr shamol

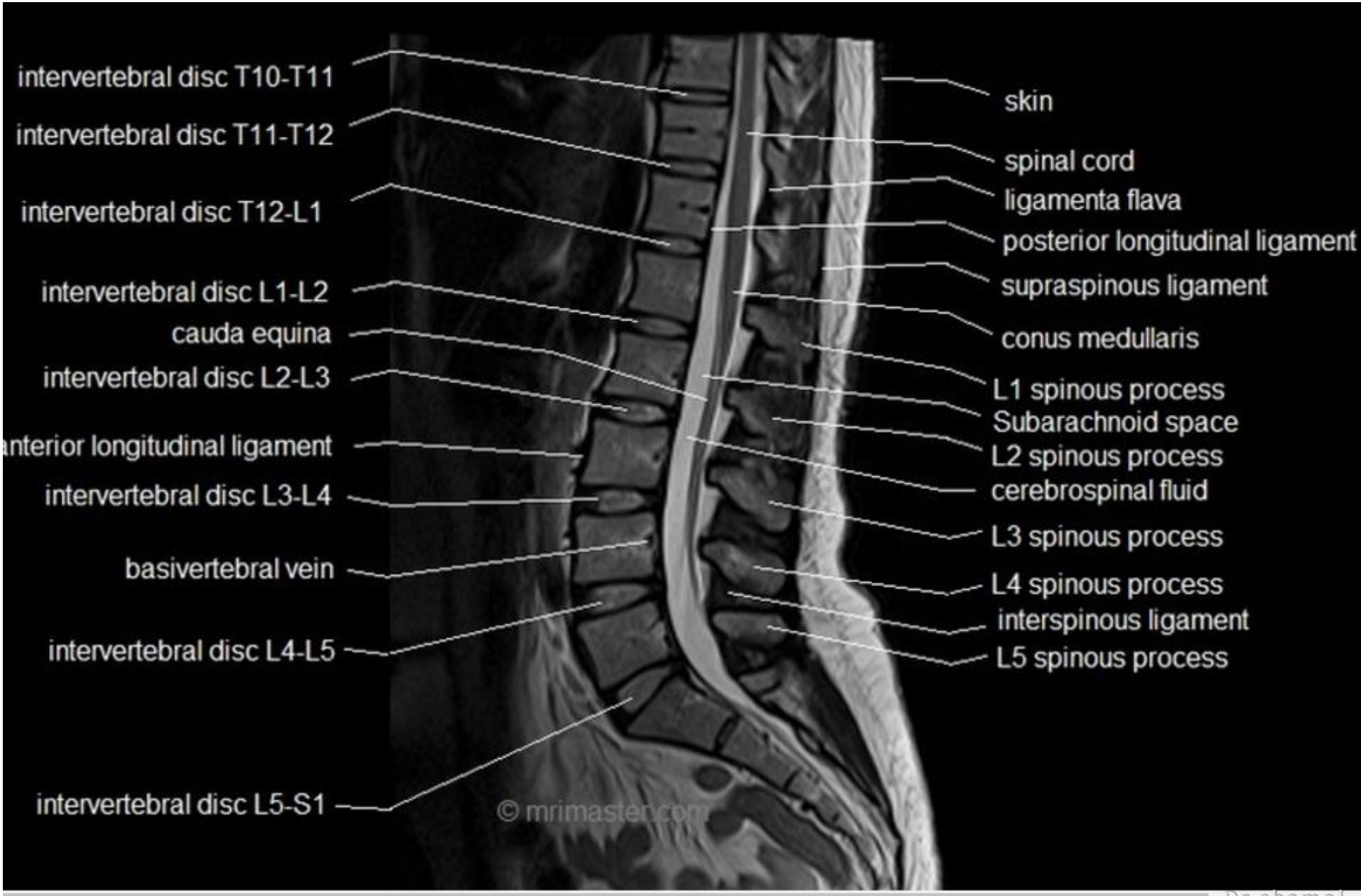

T10 nerve roots
T11 nerve roots
intervertebral disc T12-L1
T12 nerve roots
L1 transverse process
intervertebral disc L1-L2
L1 nerve roots
L2 transverse process
intervertebral disc L2-L3
L2 nerve roots
L3 transverse process
L3 nerve roots
L4 transverse process
intervertebral disc L3-L4
L4 nerve roots
L5 transverse process
intervertebral disc L4-L5
L5 nerve roots
pedicle of vertebrae
intervertebral disc L5-S1
Dr shamol

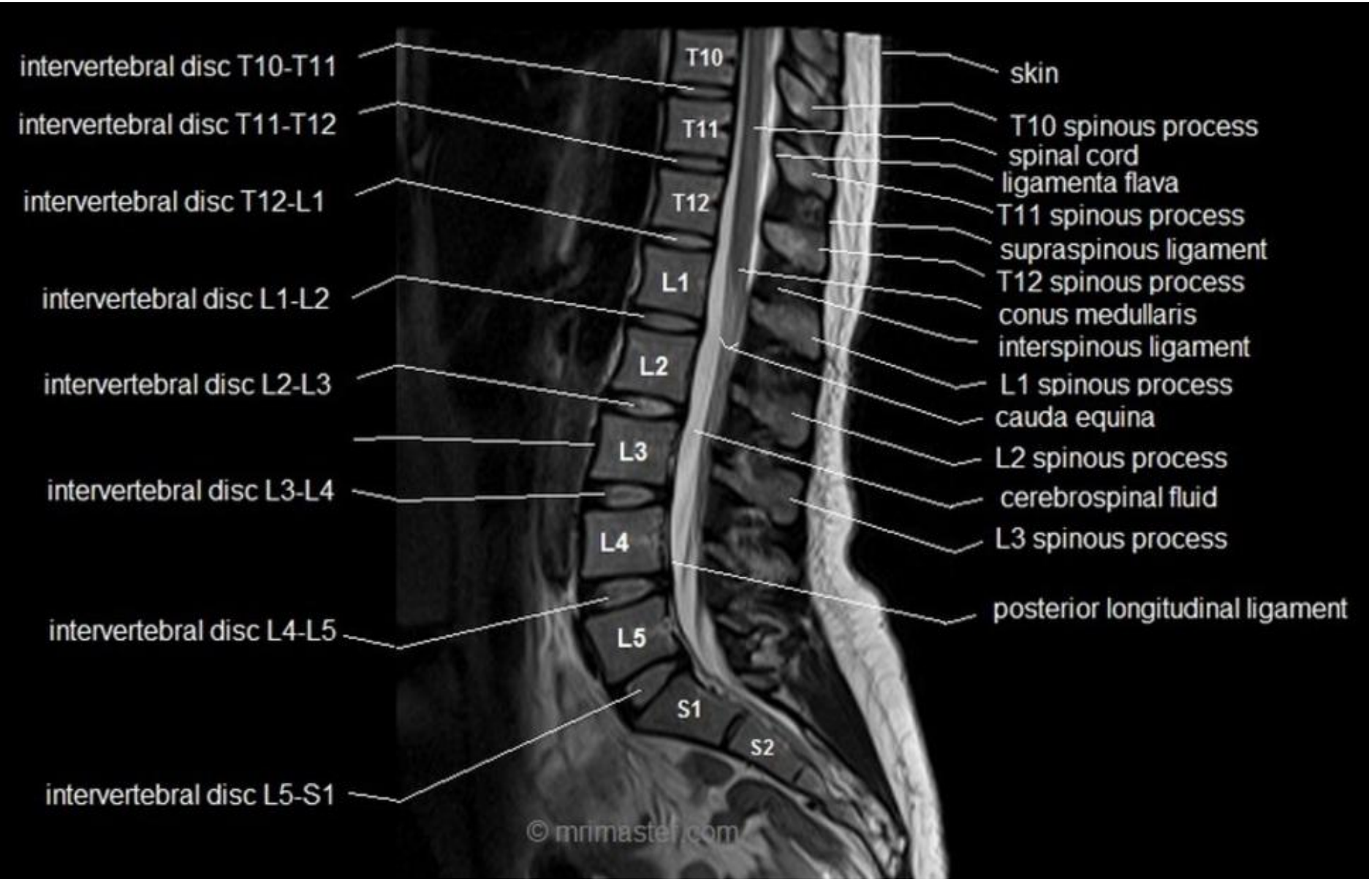

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
lumbar artery
intervertebral disc L3-L4
intervertebral disc L4-L5
facet joint
intervertebral disc L5-S1
T10 nerve roots
T11 nerve roots
T12 nerve roots
L1 nerve roots
L2 nerve roots
L3 nerve roots
L4 nerve roots
L5 nerve roots
© mrimaster.com
Dr shamol

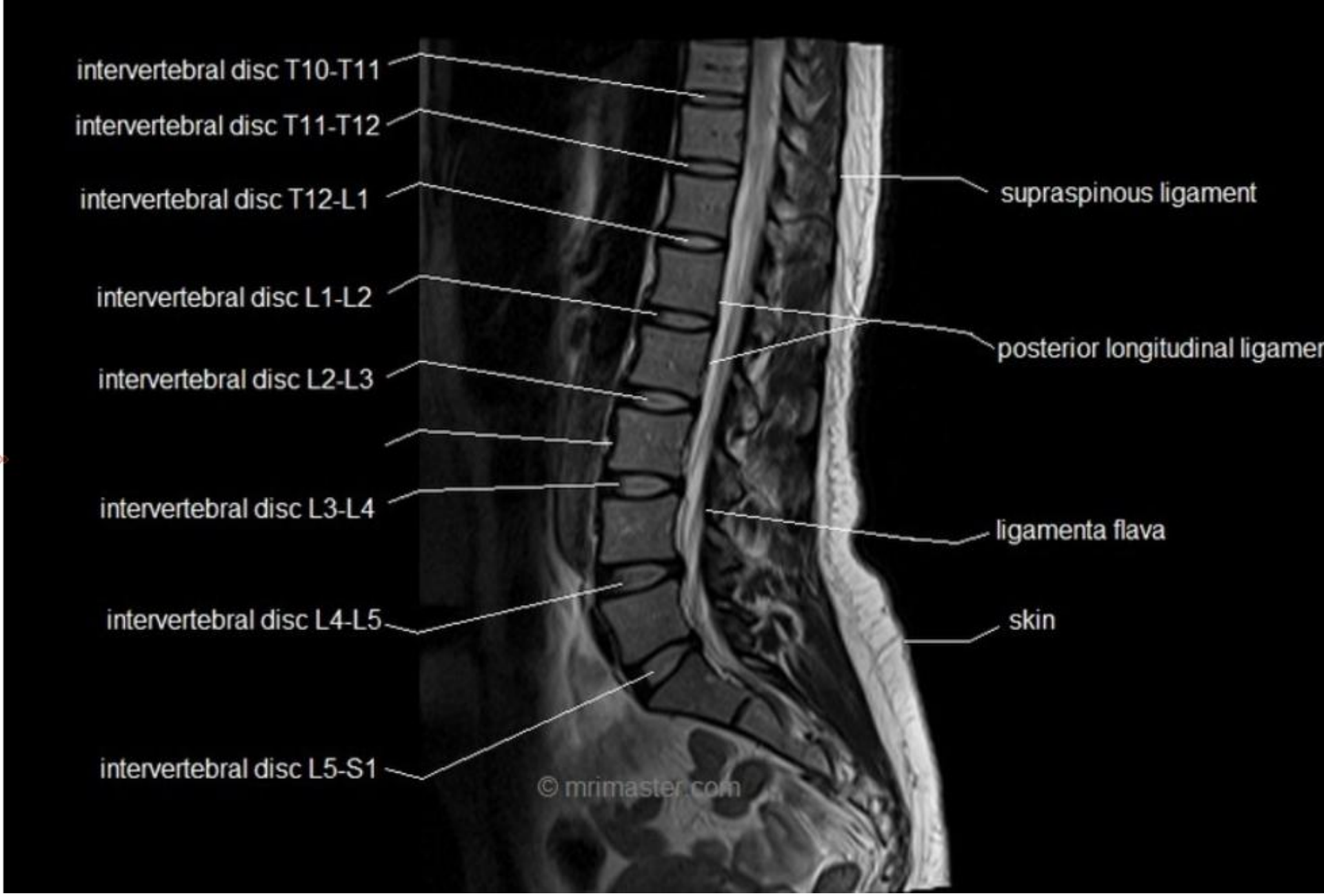

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
T10 nerve roots
T11 nerve roots
T12 nerve roots
erector spinae muscle

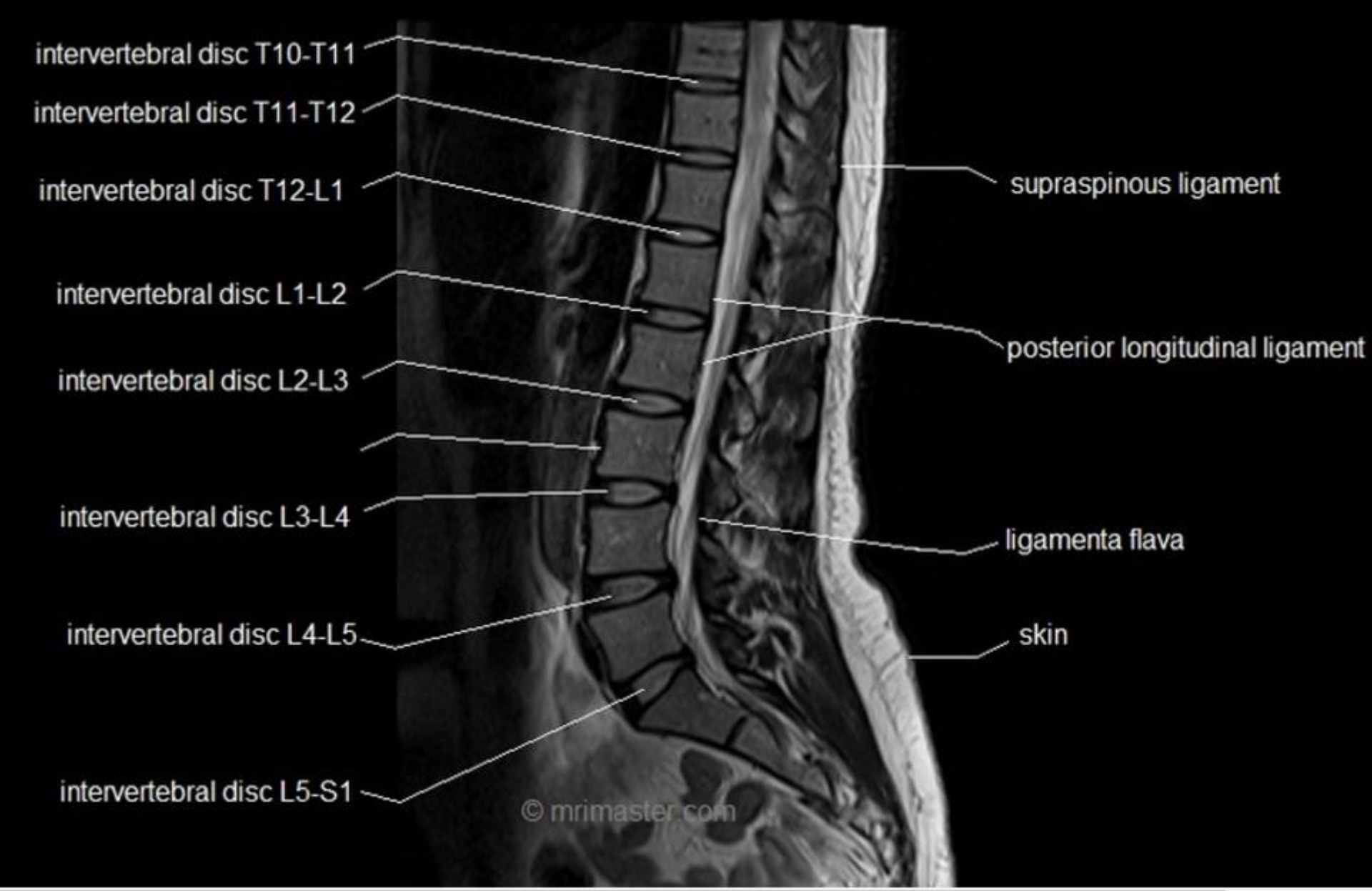

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
skin
erector spinae muscle
Dr shamol

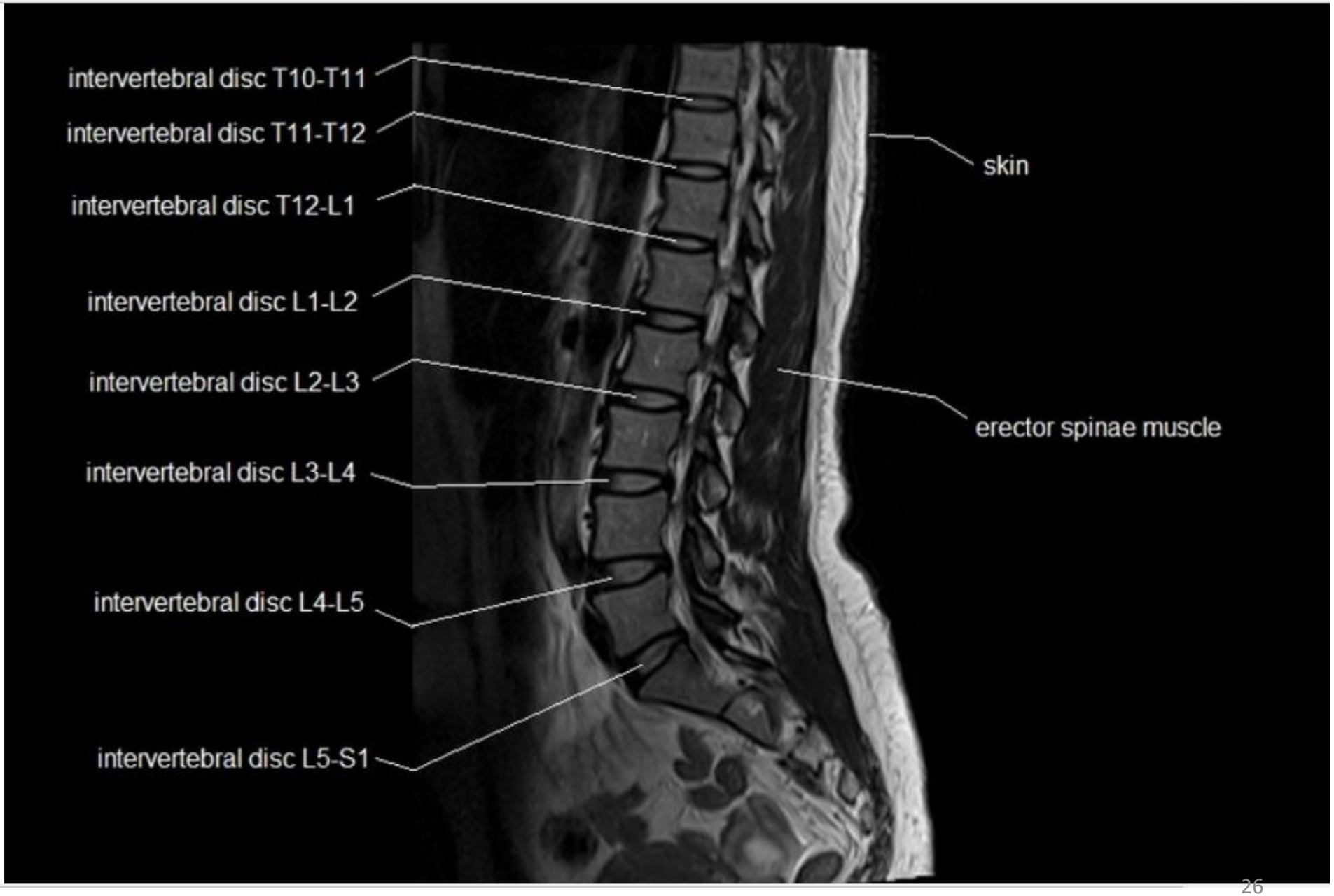

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
basivertebral vein
intervertebral disc L4-L5
intervertebral disc L5-S1
erector spinae muscle
posterior longitudinal ligament
cauda equina

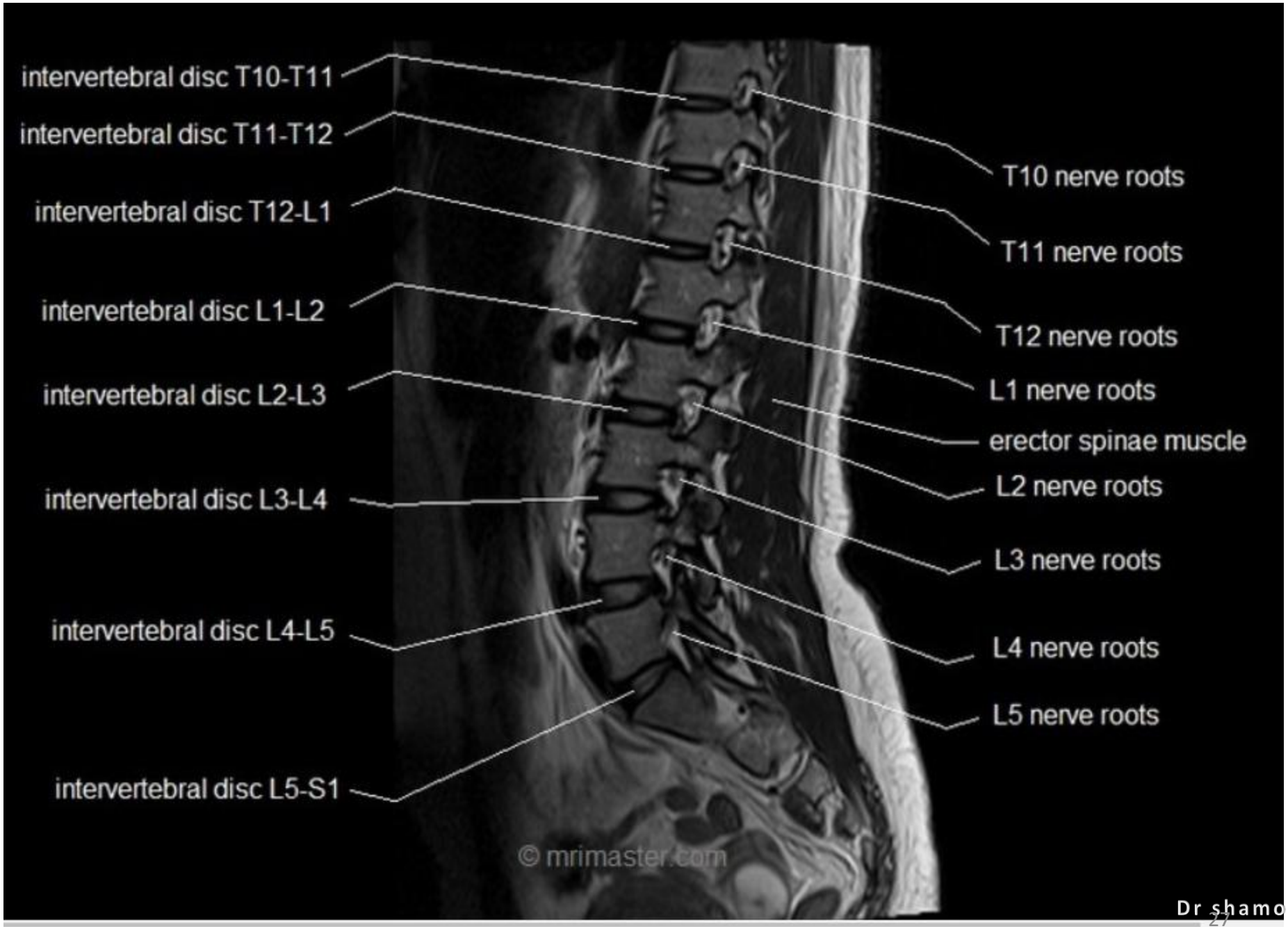

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
cauda equina
intervertebral disc L2-L3
anterior longitudinal ligament
intervertebral disc L3-L4
basivertebral vein
intervertebral disc L4-L5
intervertebral disc L5-S1
skin
spinal cord
ligamenta flava
posterior longitudinal ligament
supraspinous ligament
conus medullaris
L1 spinous process
Subarachnoid space
L2 spinous process
cerebrospinal fluid
L3 spinous process
L4 spinous process
interspinous ligament
L5 spinous process
© mrimaster.com

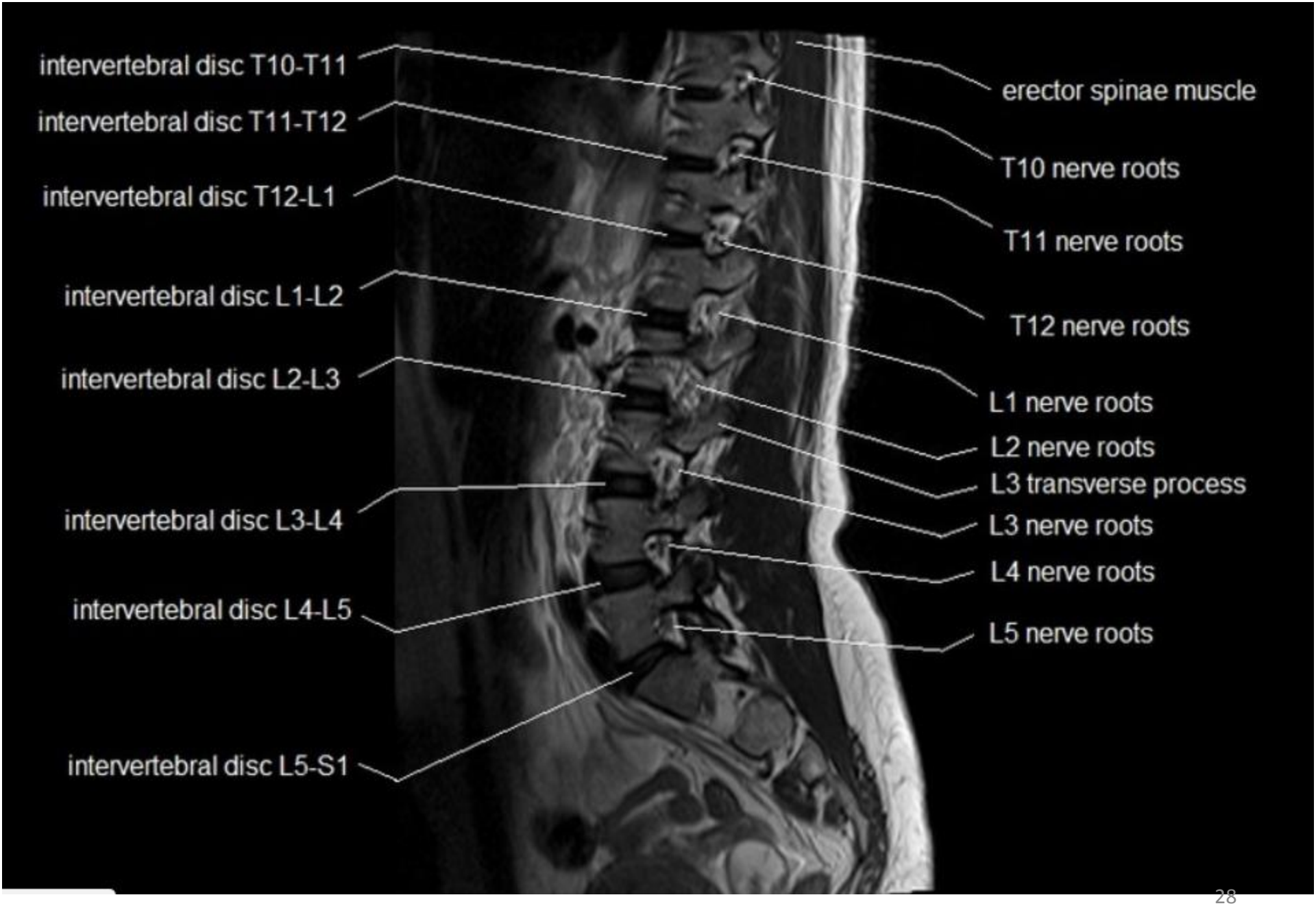

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
T10
T11
T12
L1
L2
L3
L4
L5
S1
S2
skin
T10 spinous process
spinal cord
ligamenta flava
T11 spinous process
supraspinous ligament
T12 spinous process
conus medullaris
interspinous ligament
L1 spinous process
cauda equina
L2 spinous process
cerebrospinal fluid
L3 spinous process
posterior longitudinal ligament
© mrimaster.com

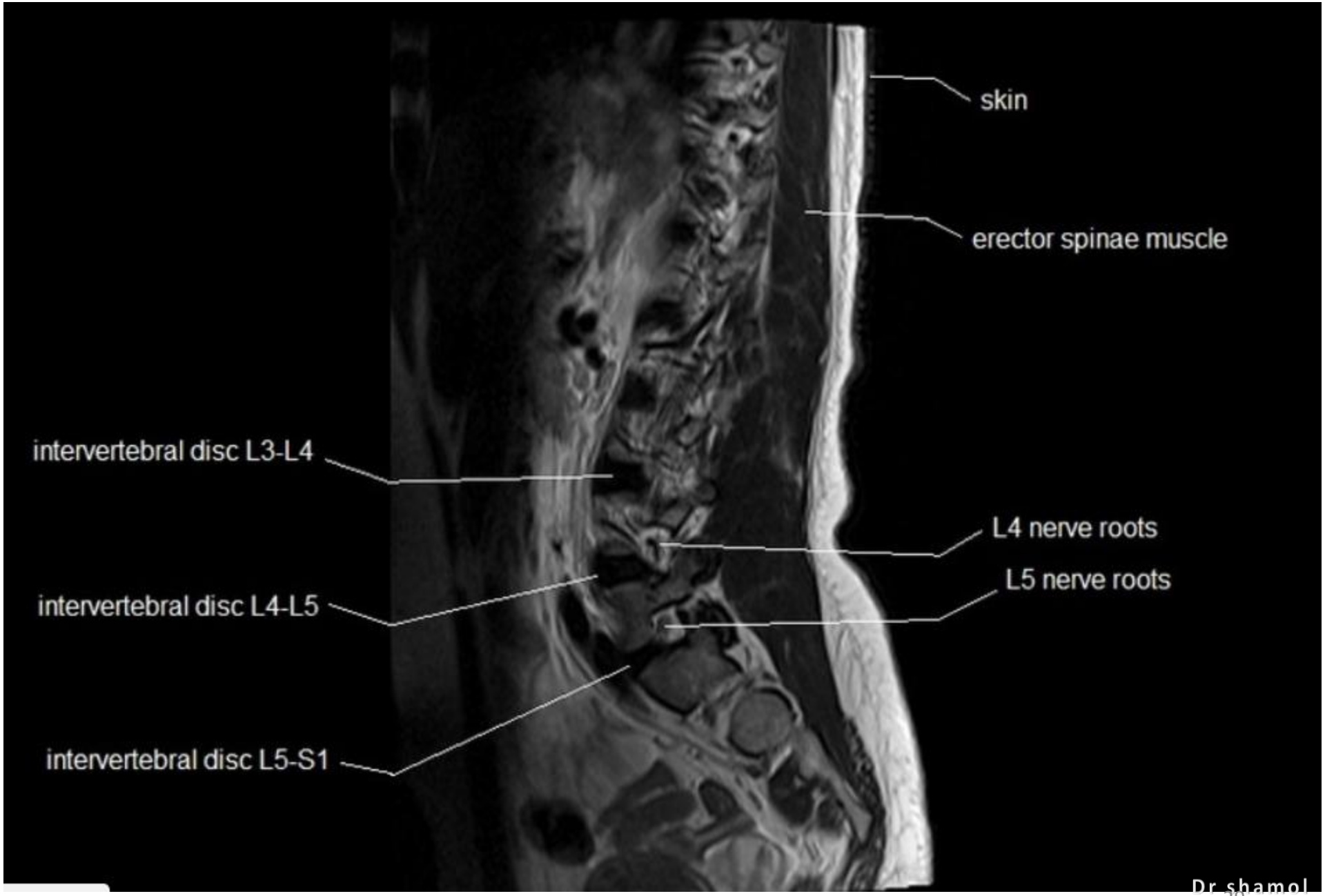

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
supraspinous ligament
posterior longitudinal ligamen
ligamenta flava
skin
© mrimaster.com


intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
supraspinous ligament
posterior longitudinal ligament
ligamenta flava
skin
© mrimaster.com


intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
skin
erector spinae muscle

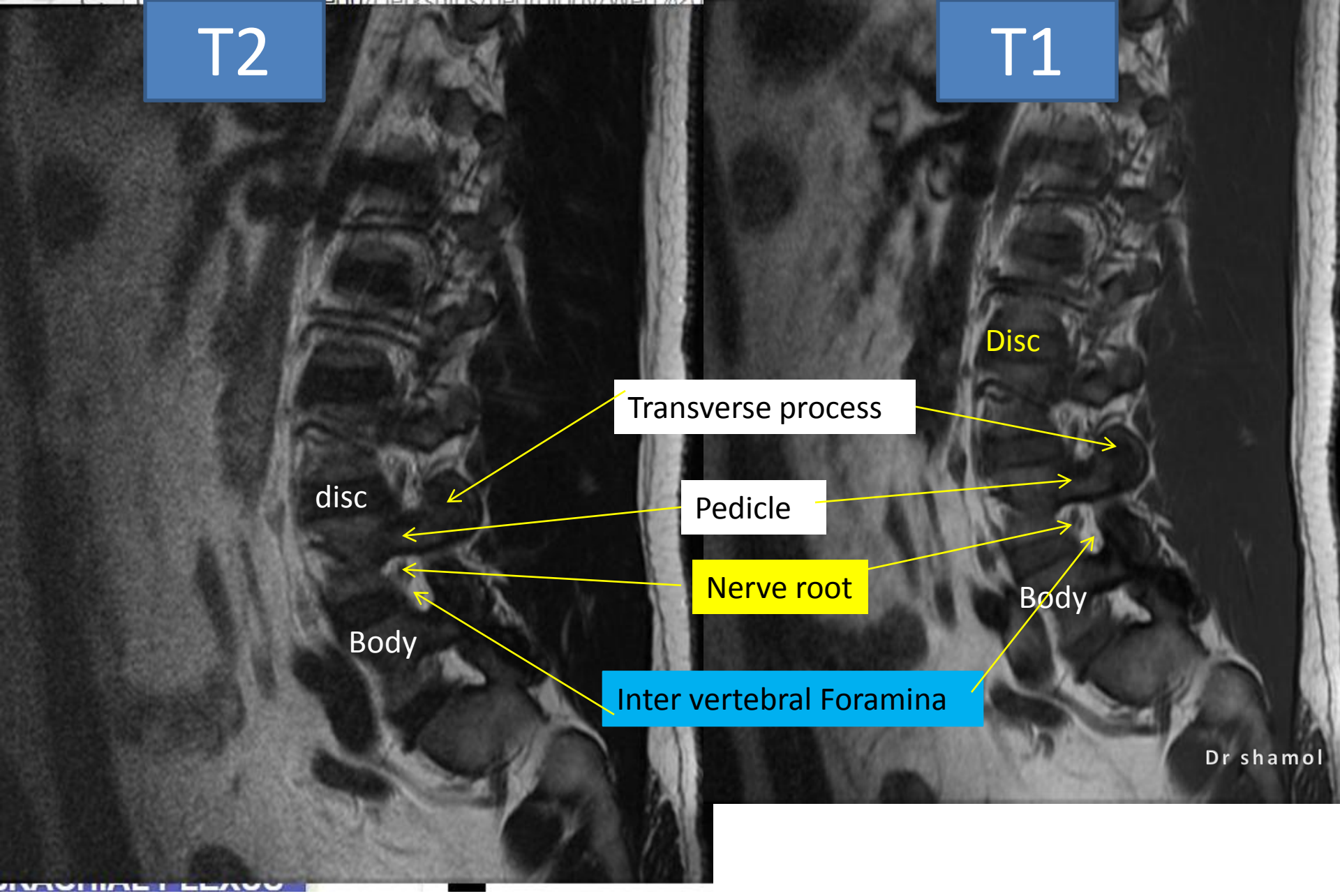

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
T10 nerve roots
T11 nerve roots
T12 nerve roots
L1 nerve roots
erector spinae muscle
L2 nerve roots
L3 nerve roots
L4 nerve roots
L5 nerve roots
© mrimaster.com

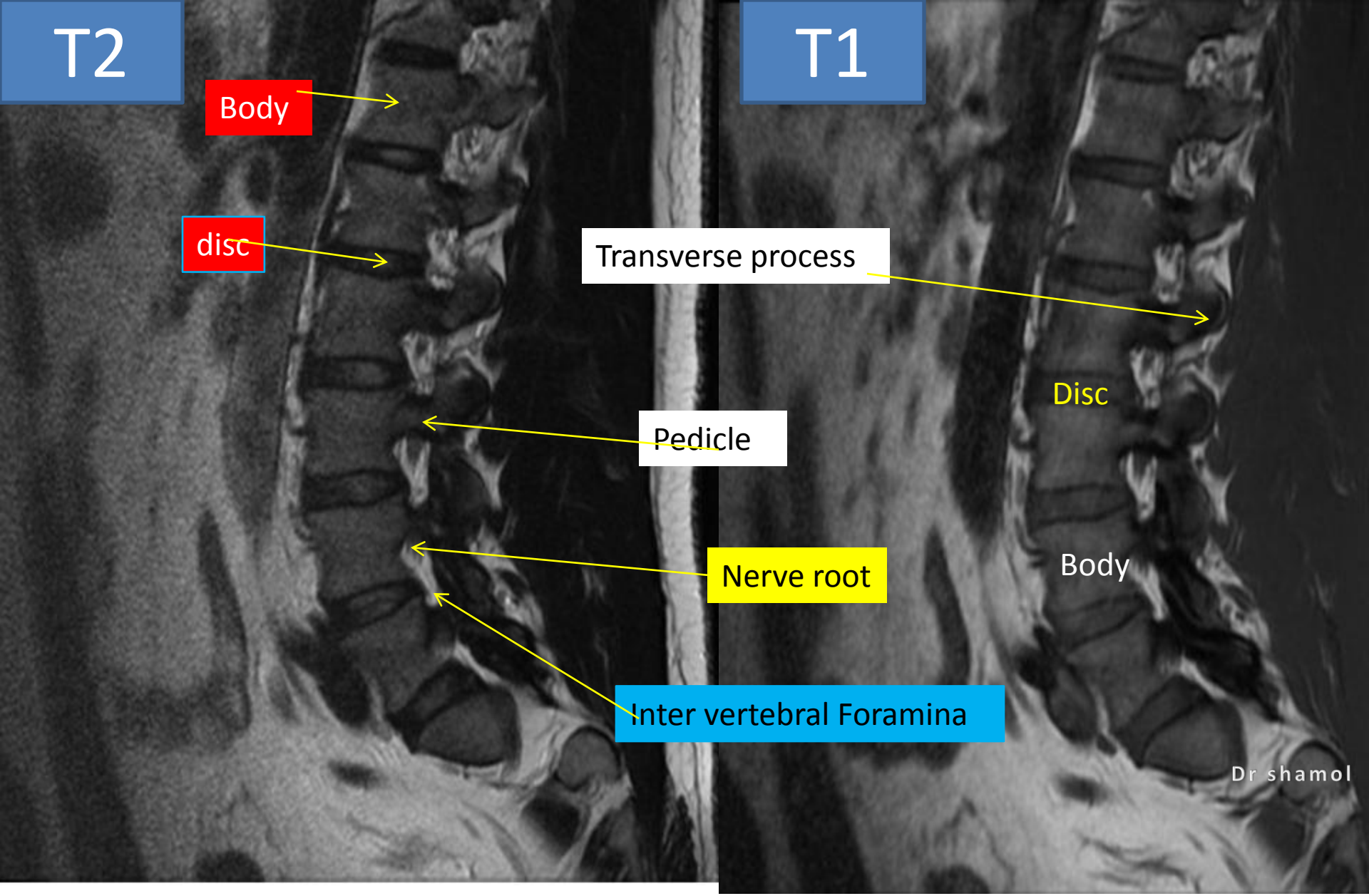

intervertebral disc T10-T11
intervertebral disc T11-T12
intervertebral disc T12-L1
intervertebral disc L1-L2
intervertebral disc L2-L3
intervertebral disc L3-L4
intervertebral disc L4-L5
intervertebral disc L5-S1
erector spinae muscle
T10 nerve roots
T11 nerve roots
T12 nerve roots
L1 nerve roots
L2 nerve roots
L3 transverse process
L3 nerve roots
L4 nerve roots
L5 nerve roots

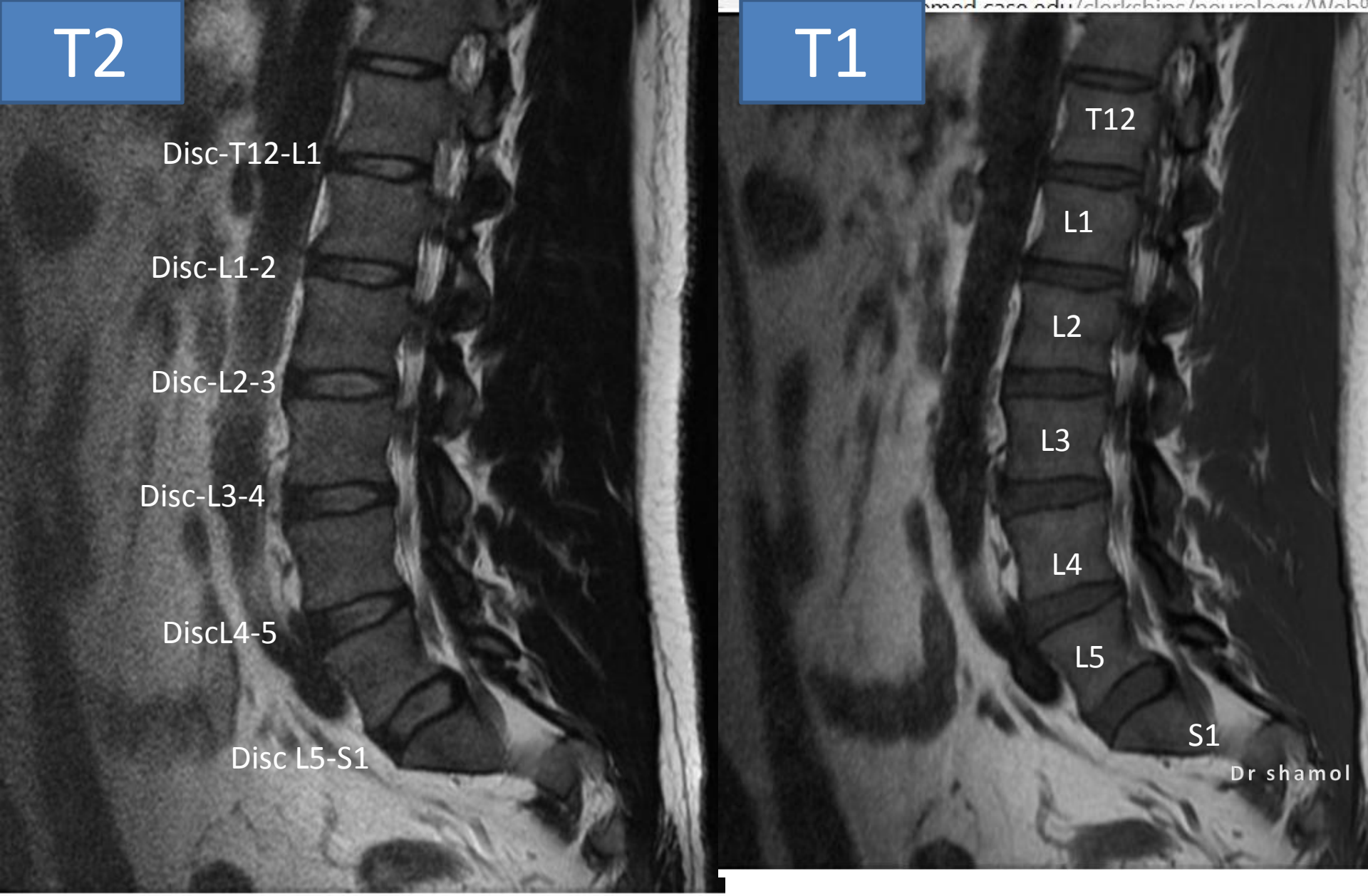

skin
erector spinae muscle
intervertebral disc L3-L4
L4 nerve roots
L5 nerve roots
intervertebral disc L4-L5
intervertebral disc L5-S1
Dr shamol

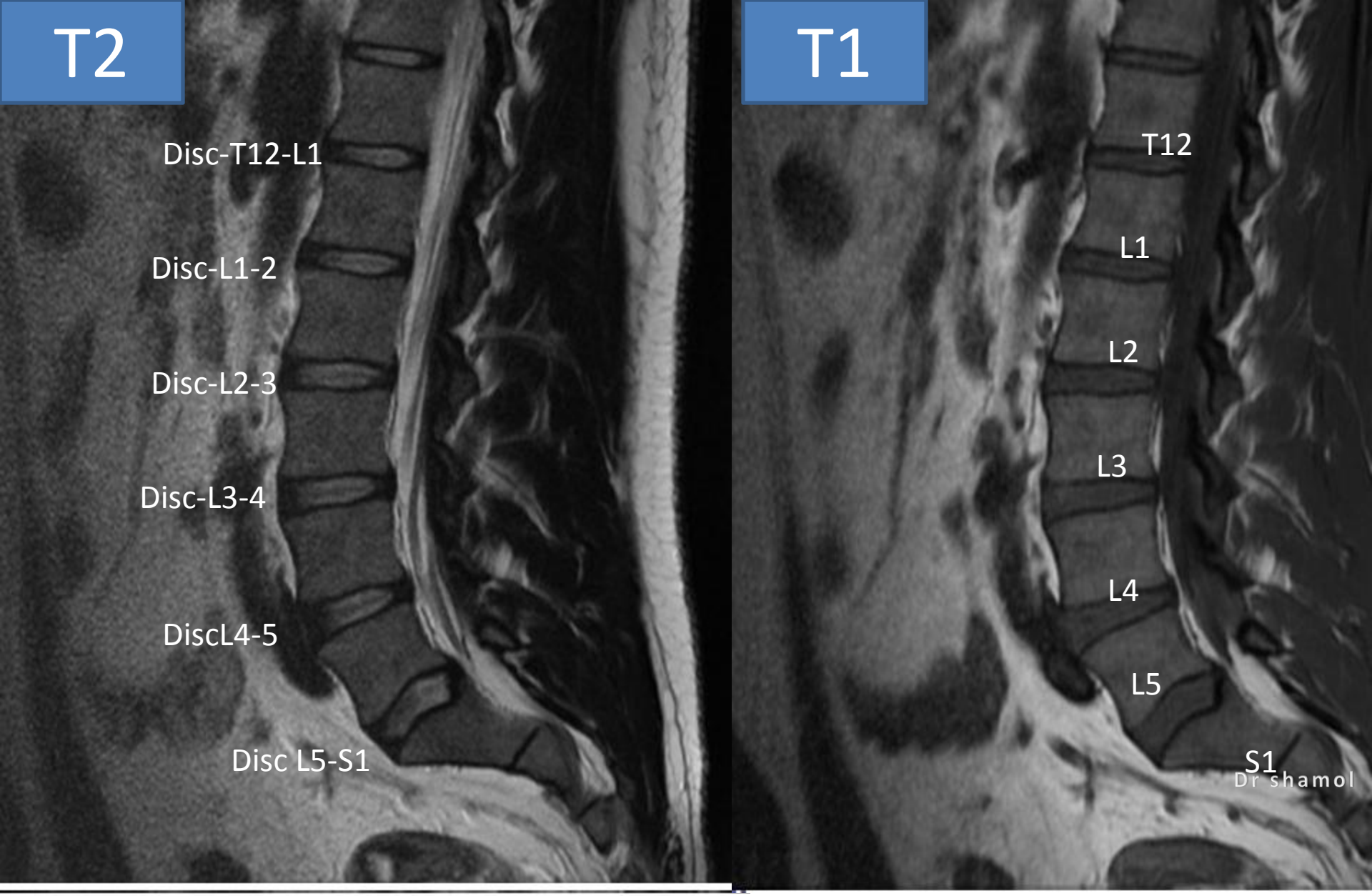
Sequence of
sagittal section film
one by one (in both T1&T2)

Dr shamol

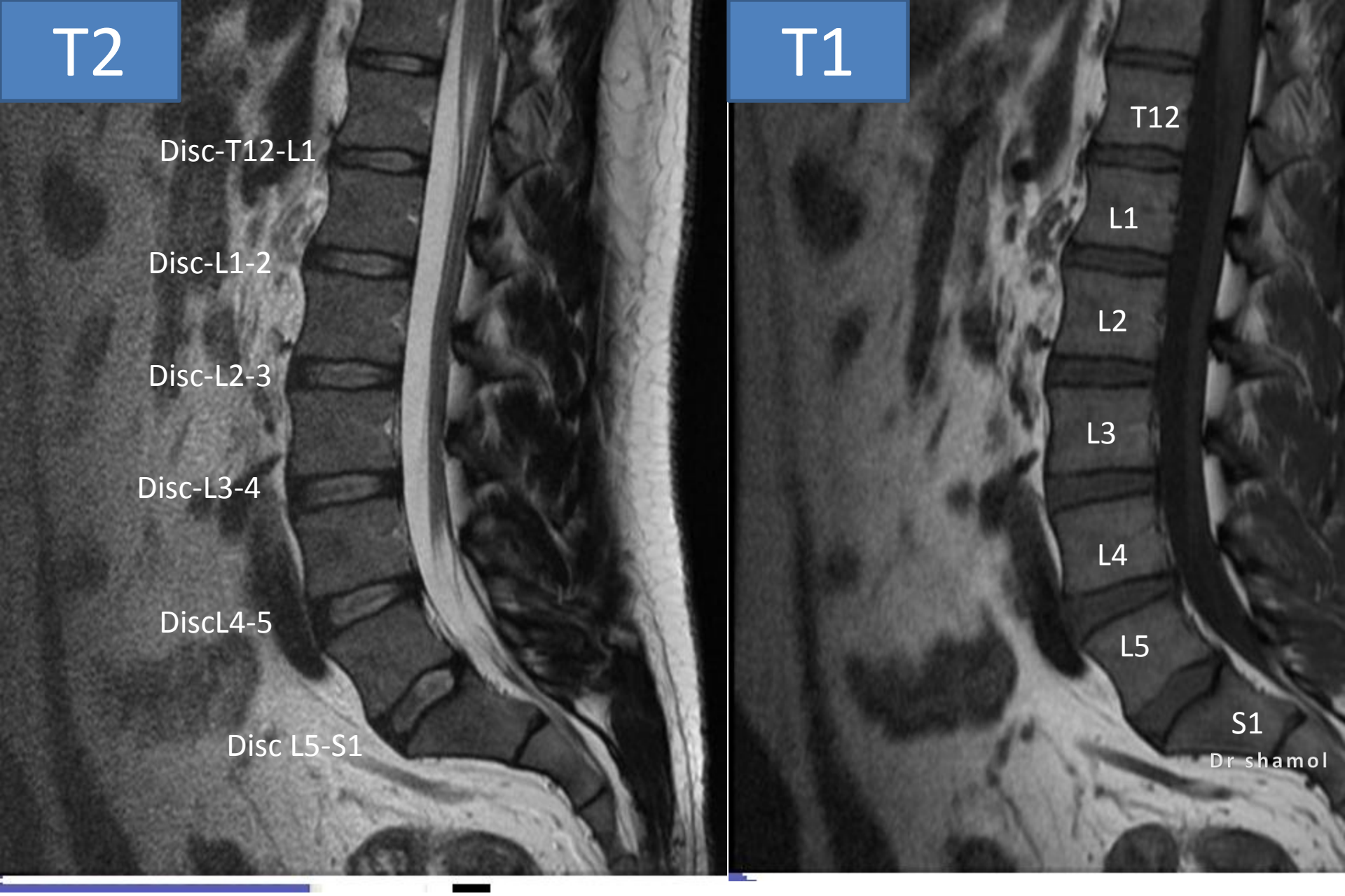

T2
T1
Disc
Transverse process
disc
Pedicle
Nerve root
Body
Body
Inter vertebral Foramina
Dr shamol

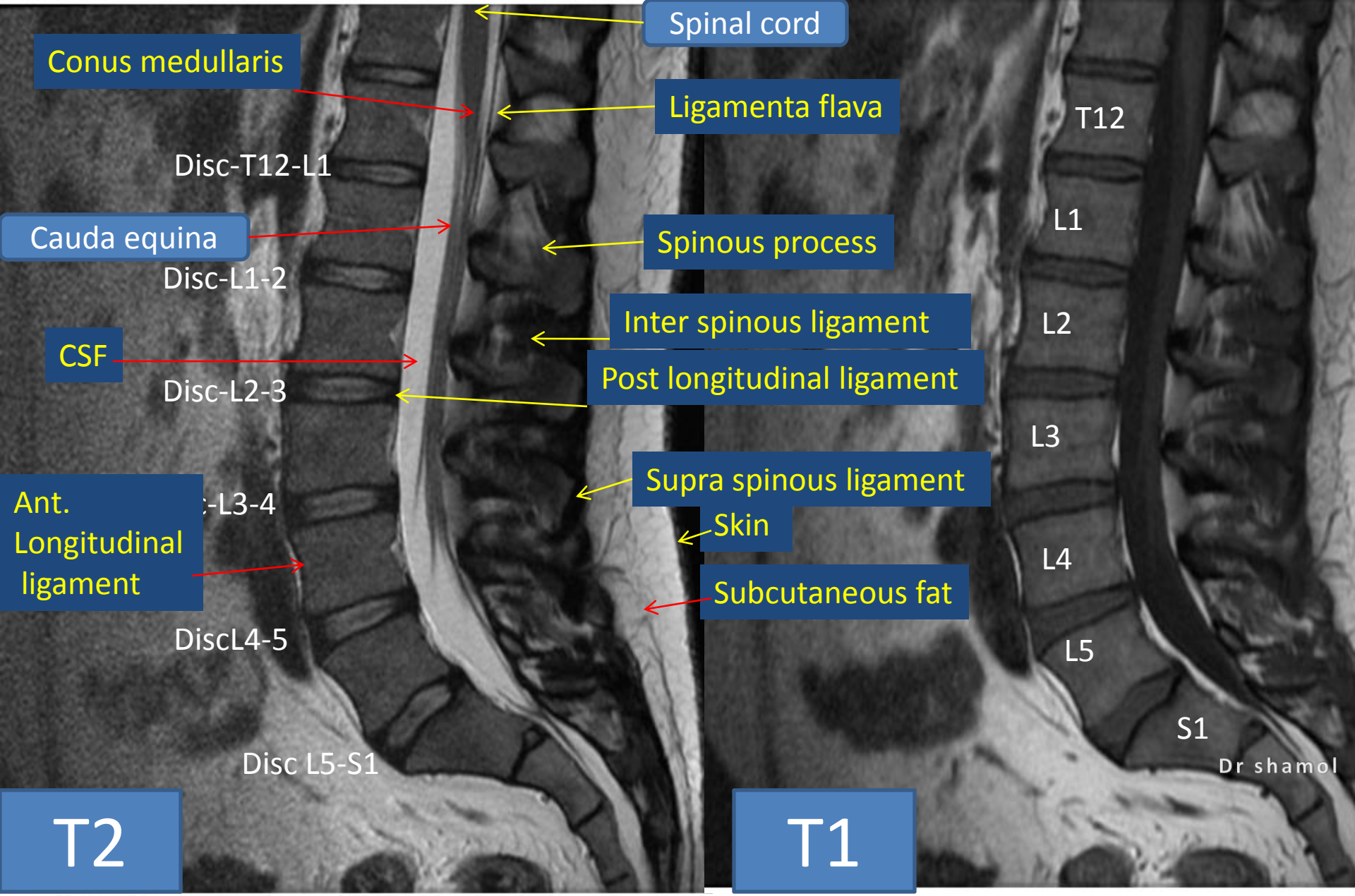

T2
T1
Body
disc
Transverse process
Disc
Pedicle
Nerve root
Body
Inter vertebral Foramina
Dr shamol

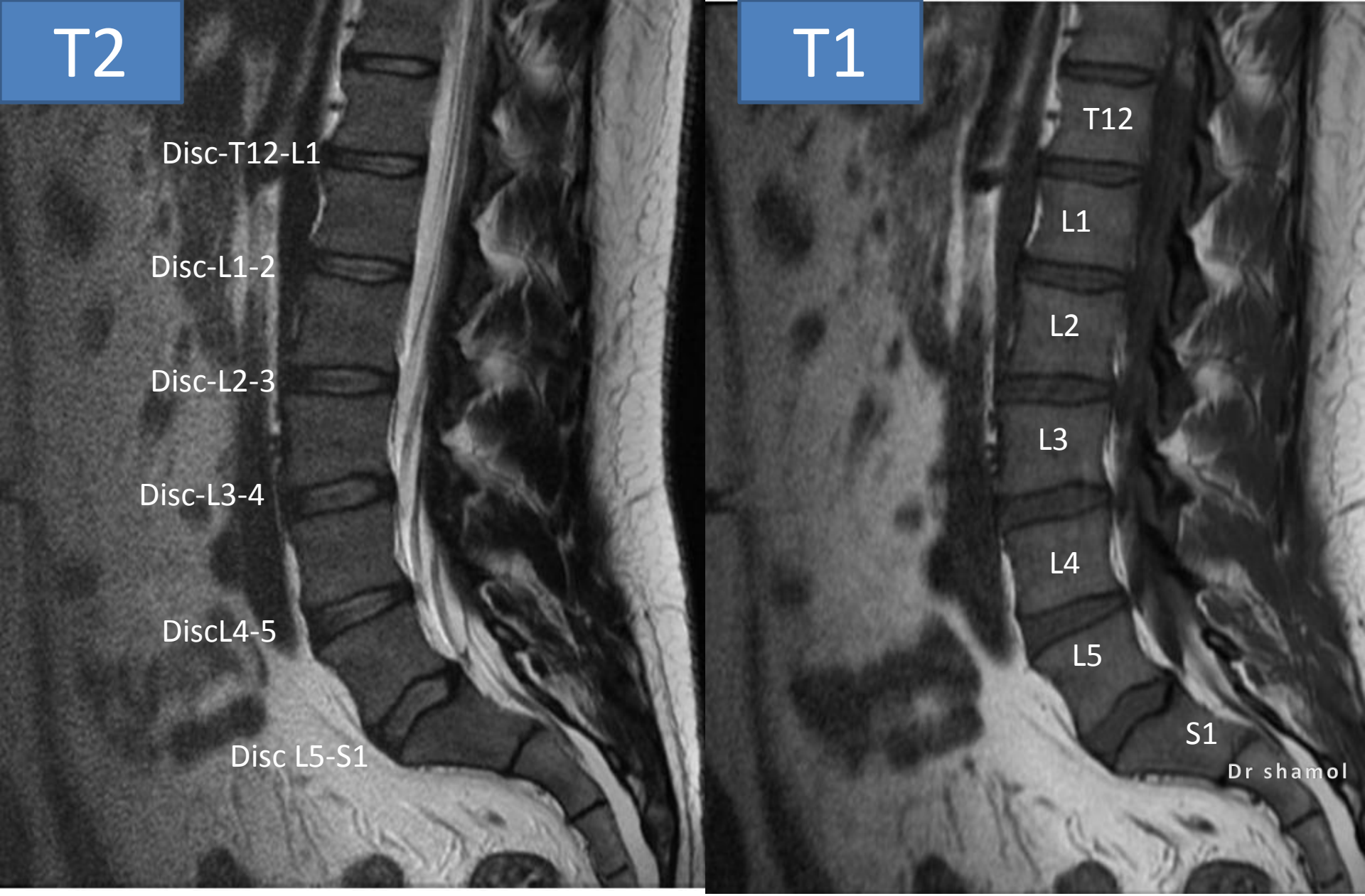

T2
Disc-T12-L1
Disc-L1-2
Disc-L2-3
Disc-L3-4
DiscL4-5
Disc L5-S1
T1
T12
L1
L2
L3
L4
L5
S1
Dr shamol


T2
Disc-T12-L1
Disc-L1-2
Disc-L2-3
Disc-L3-4
DiscL4-5
Disc L5-S1
T1
T12
L1
L2
L3
L4
L5
S1
Dr shamol

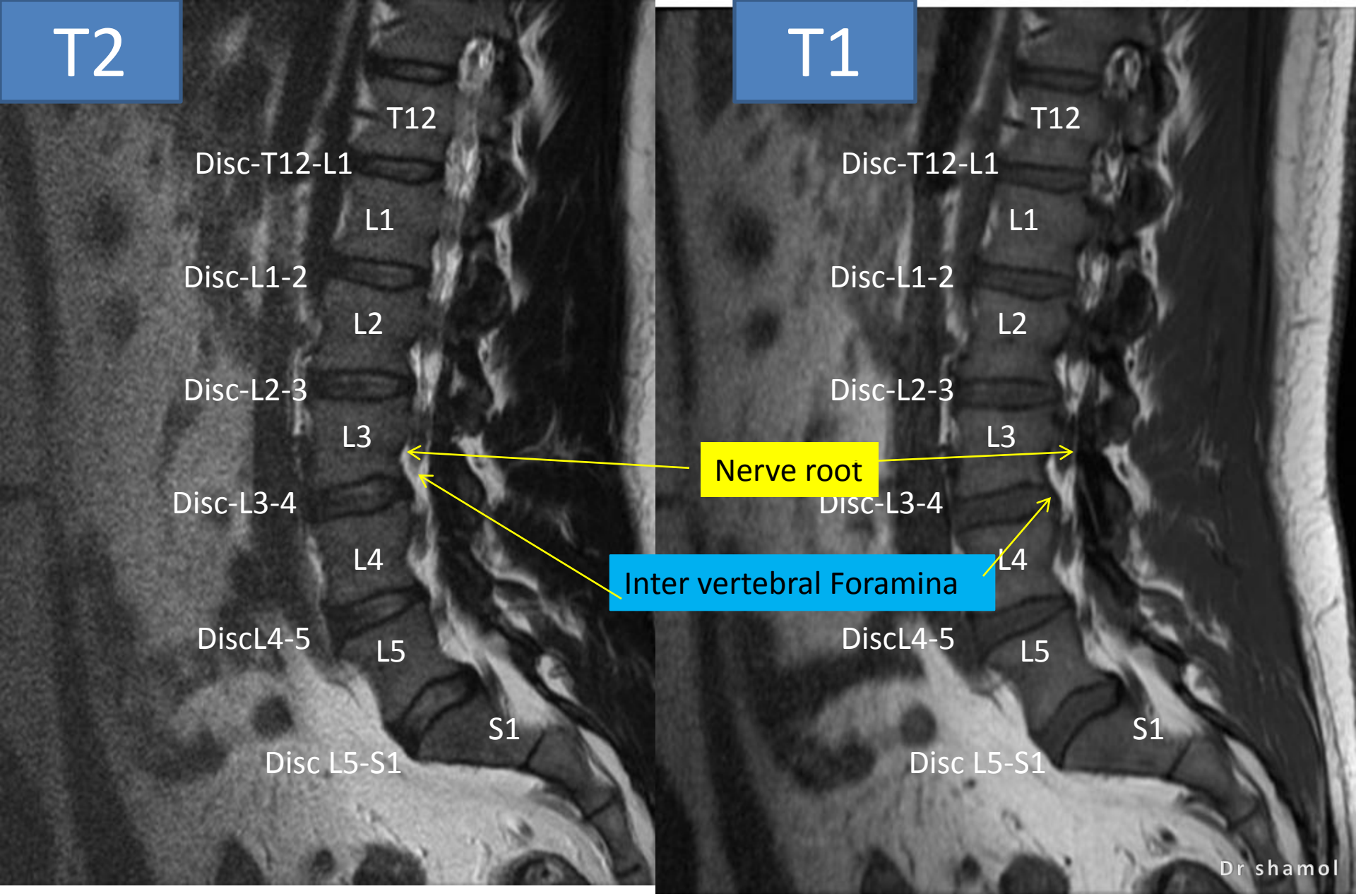
Dr shamol

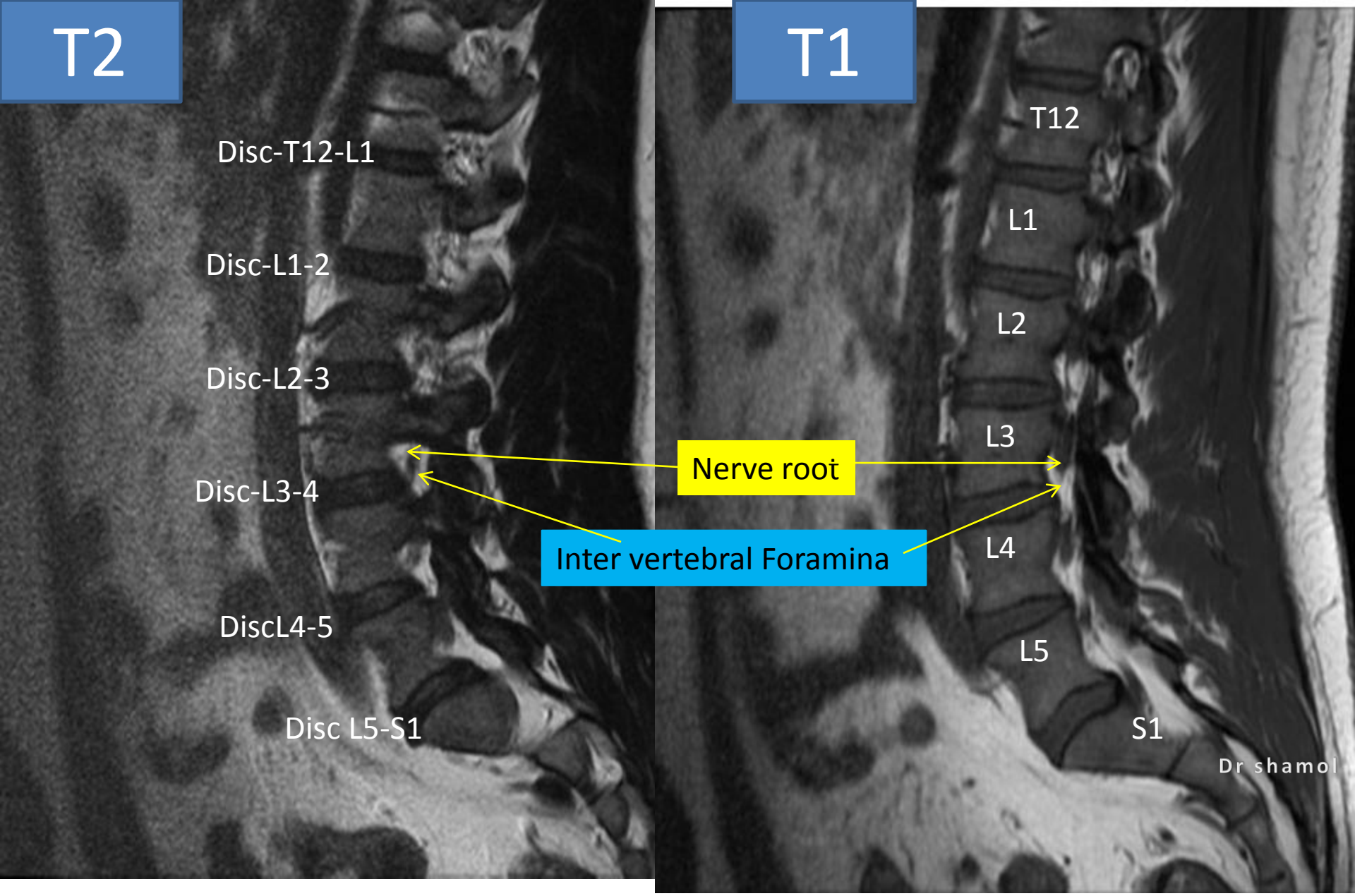

T2
Disc-T12-L1
Disc-L1-2
Disc-L2-3
Disc-L3-4
DiscL4-5
Disc L5-S1
T1
T12
L1
L2
L3
L4
L5
S1
Dr shamol

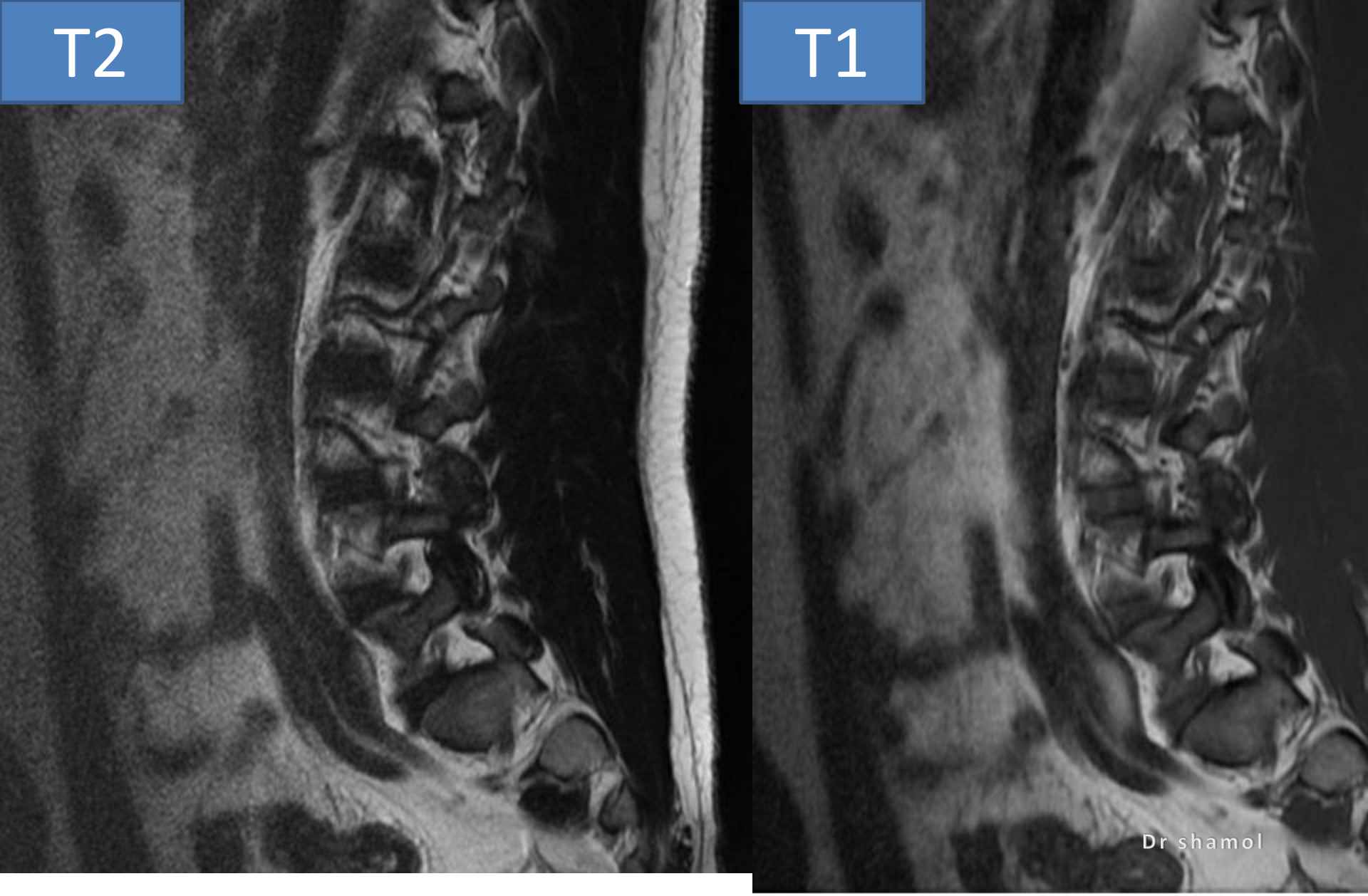

Spinal cord
Conus medullaris
Ligamenta flava
T12
Disc-T12-L1
L1
Cauda equina
Spinous process
Disc-L1-2
Inter spinous ligament
L2
CSF
Post longitudinal ligament
Disc-L2-3
L3
Supra spinous ligament
Ant.
Longitudinal
ligament
-L3-4
Skin
L4
Subcutaneous fat
DiscL4-5
L5
S1
Disc L5-S1
Dr shamol
T2
T1


T2
Disc-T12-L1
Disc-L1-2
Disc-L2-3
Disc-L3-4
DiscL4-5
Disc L5-S1
T1
T12
L1
L2
L3
L4
L5
S1
Dr shamol

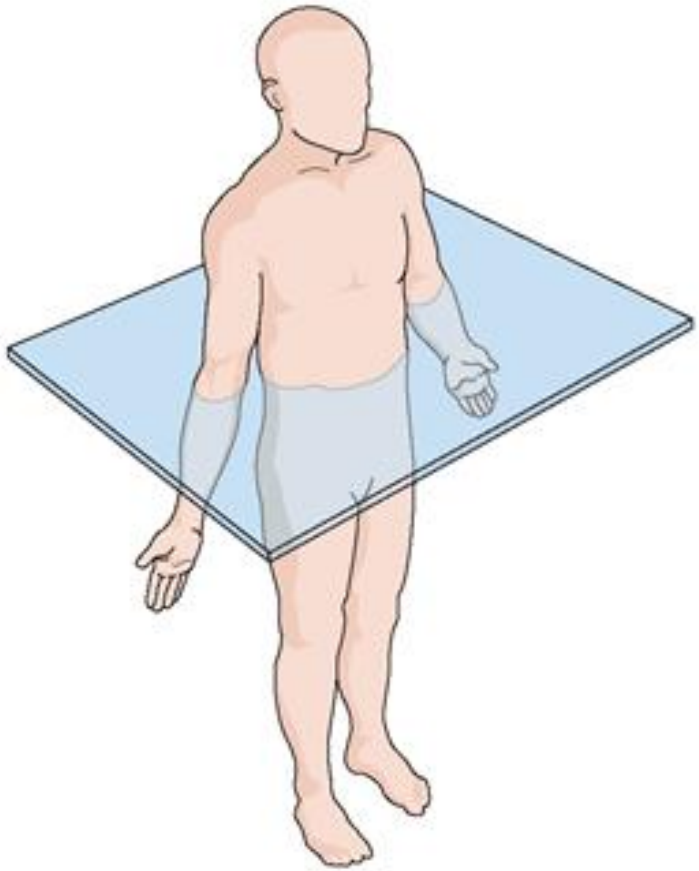
Dr shamol

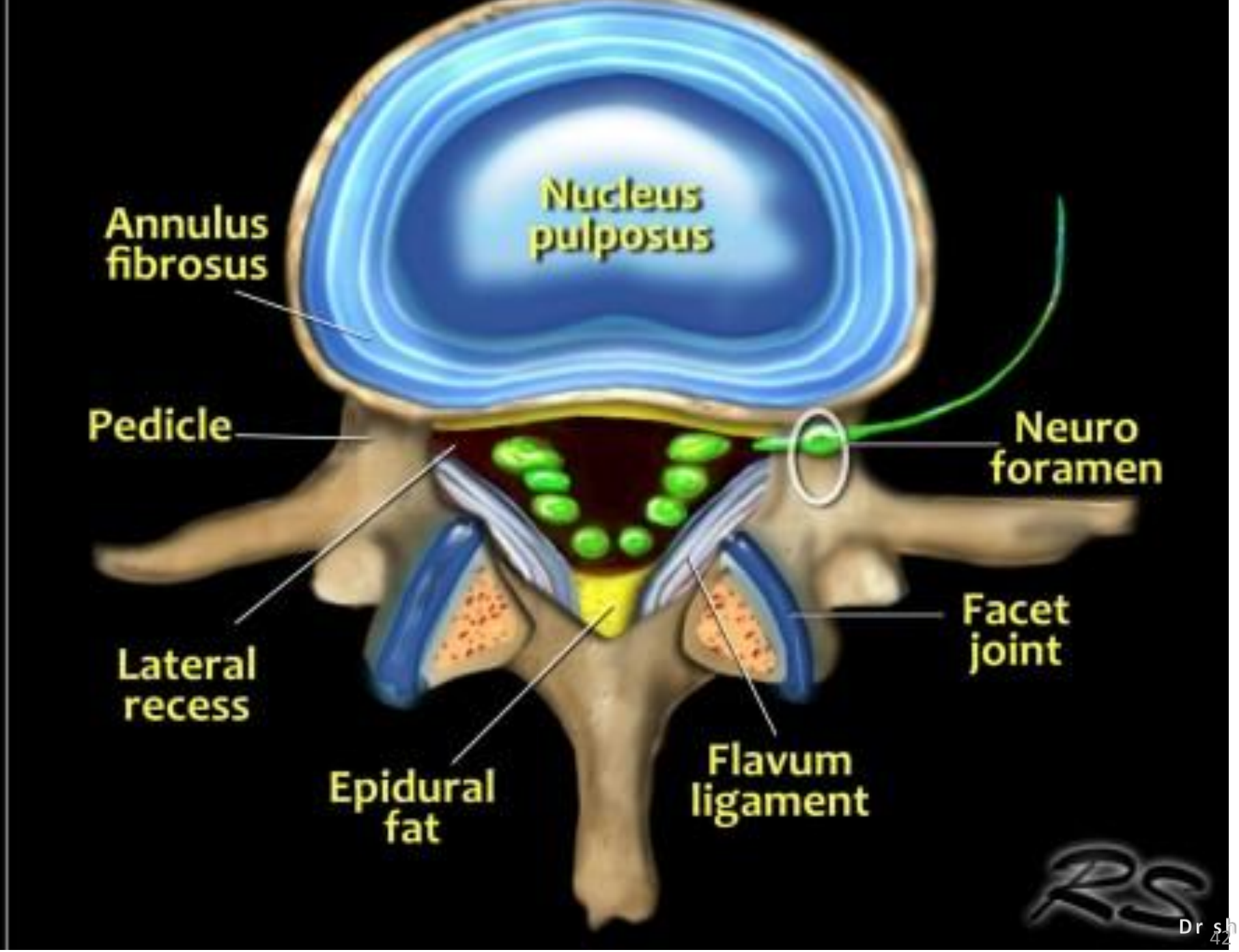

T2
T1
T12
Disc-T12-L1
L1
Disc-L1-2
L2
Disc-L2-3
L3
Disc-L3-4
L4
DiscL4-5
L5
S1
Disc L5-S1
Nerve root
Inter vertebral Foramina
Dr shamol

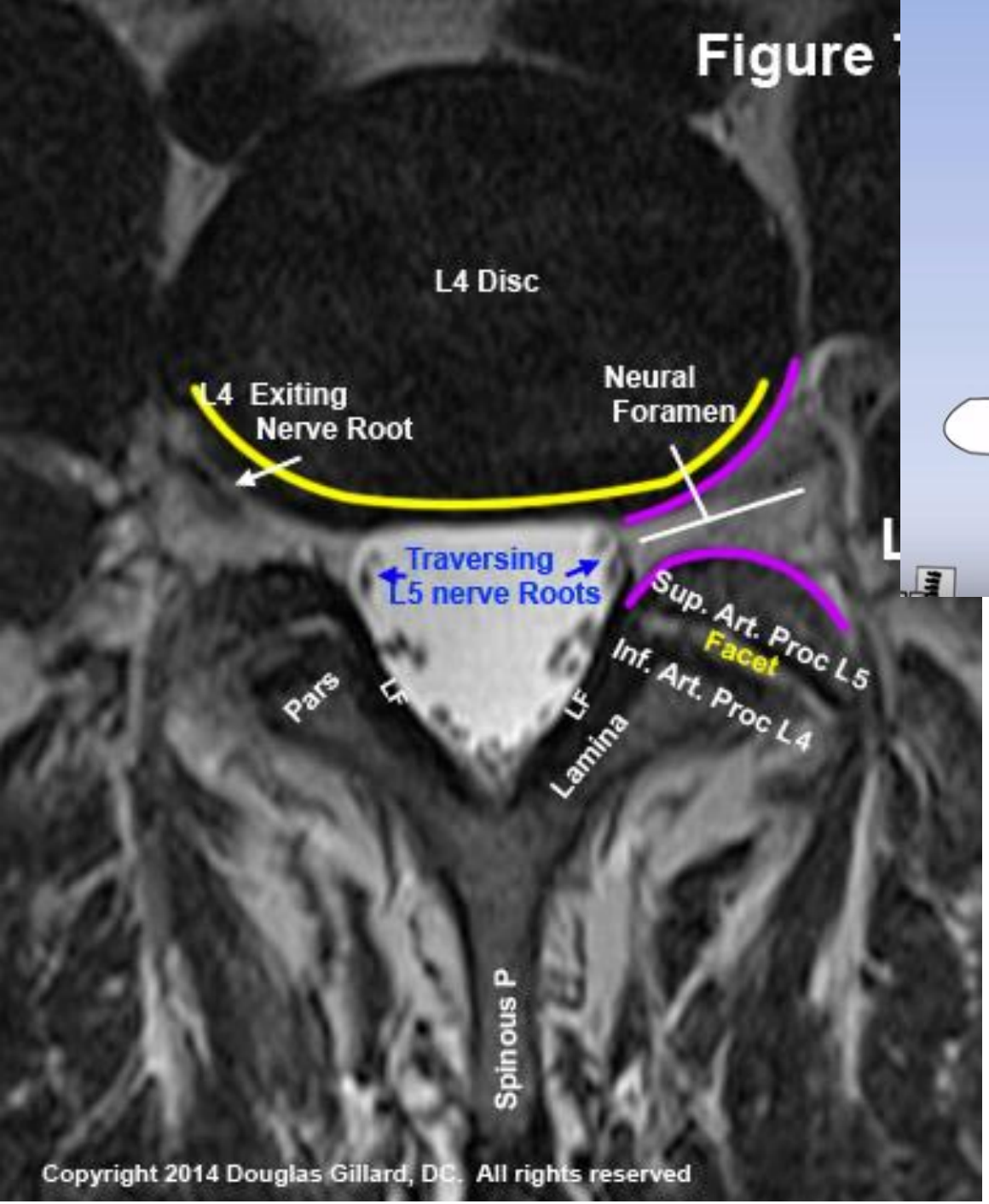

T2
Disc-T12-L1
Disc-L1-2
Disc-L2-3
Disc-L3-4
DiscL4-5
Disc L5-S1
T1
T12
L1
L2
L3
L4
L5
S1
Nerve root
Inter vertebral Foramina
Dr shamol

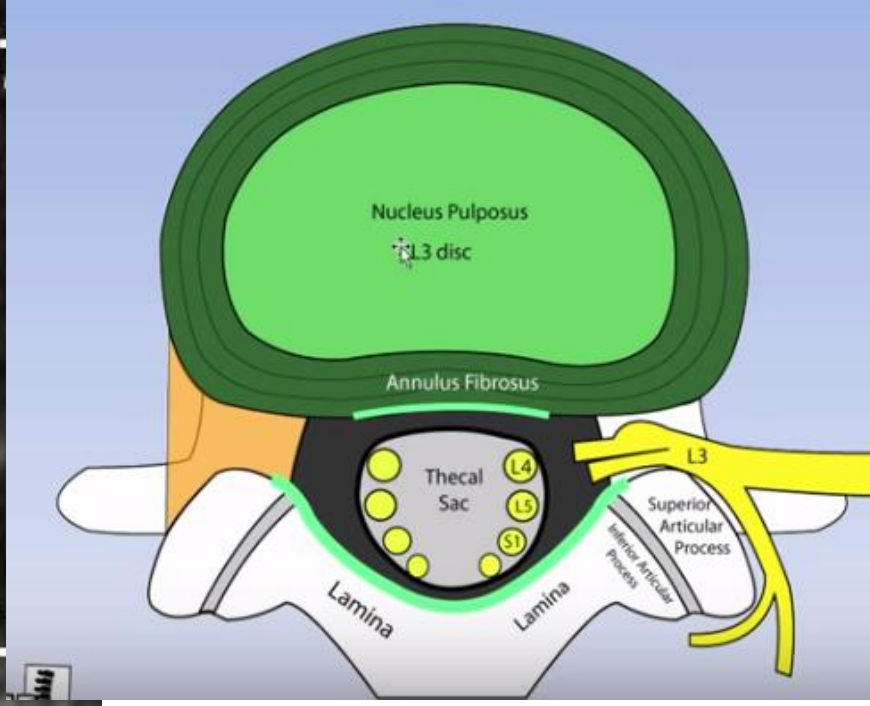

T2
T1
Dr shamol

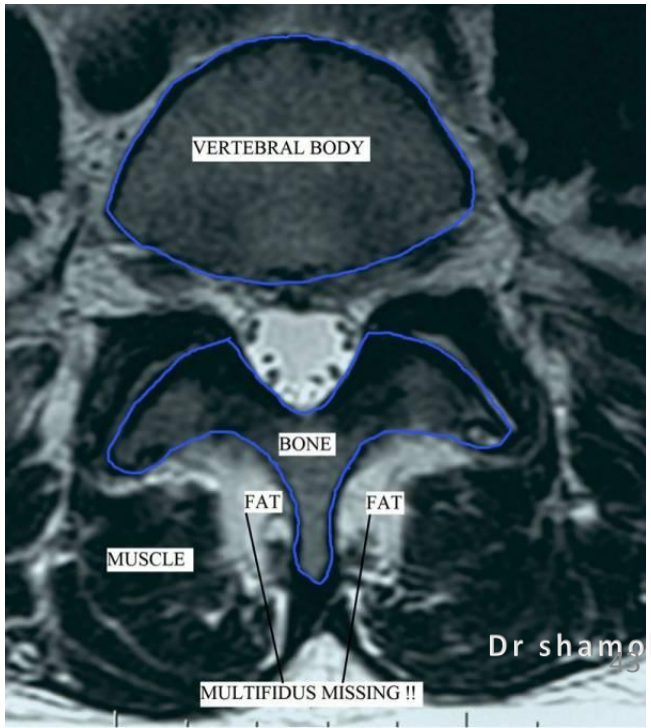
ANATOMY OF AXIAL FILM OF LS SPINE



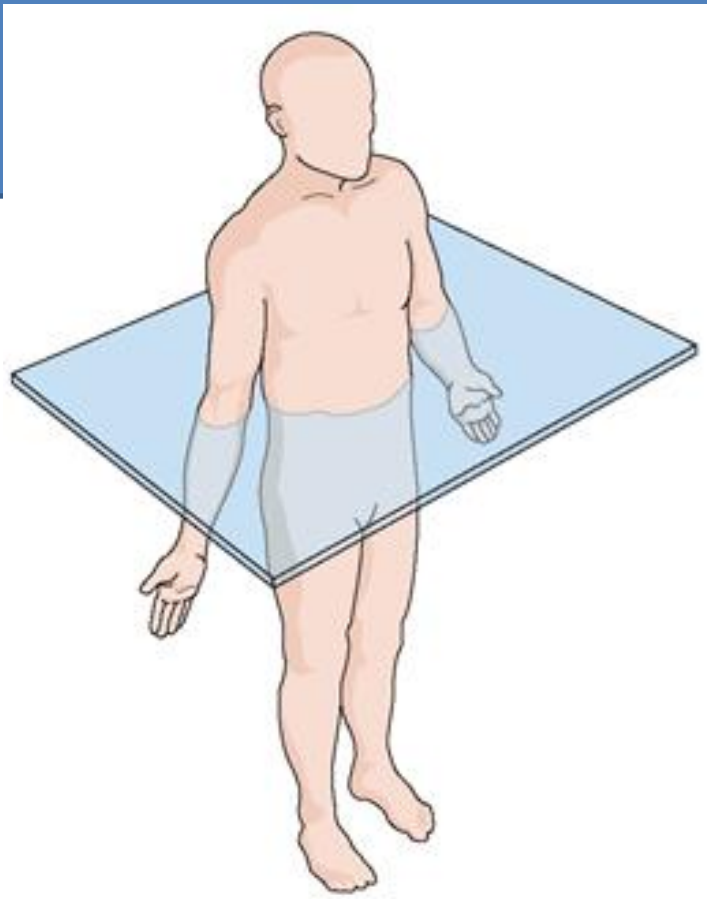

Annulus fibrosus
Nucleus pulposus
Pedicle
Neuro foramen
Facet joint
Lateral recess
Epidural fat
Flavum ligament
RS


L4 Disc
L4 Exiting Nerve Root
Neural Foramen
Traversing L5 nerve Roots
Sup. Art. Proc L5
Facet
Inf. Art. Proc L4
Pars
LF
LF
Lamina
Spinous P
Copyright 2014 Douglas Gillard, DC. All rights reserved

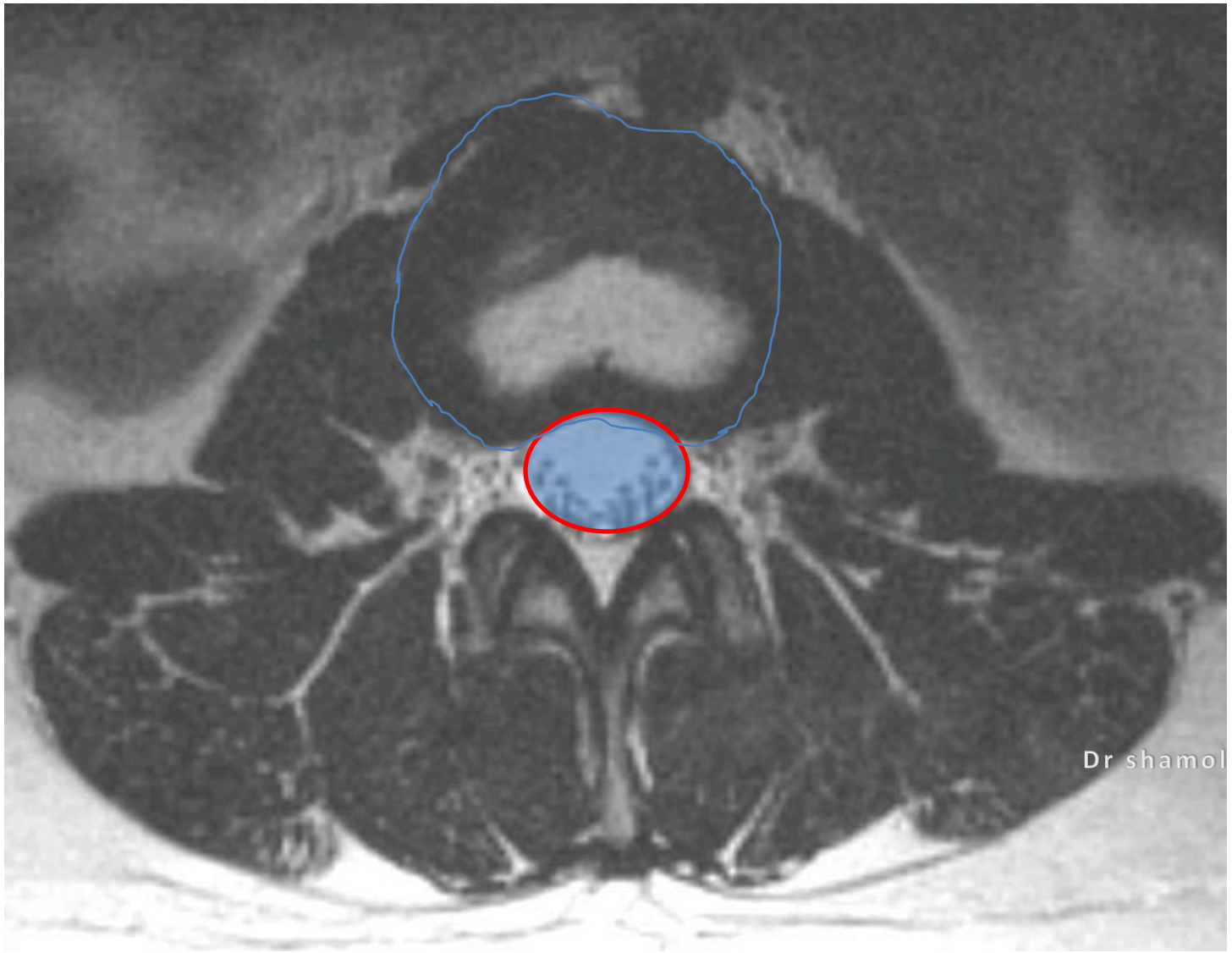

Nucleus Pulposus
L3 disc
Annulus Fibrosus
Thecal Sac
L4
L5
S1
L3
Superior Articular Process
Inferior Articular Process
Lamina
Lamina


VERTEBRAL BODY
BONE
FAT
FAT
MUSCLE
MULTIFIDUS MISSING !!
Dr shamol

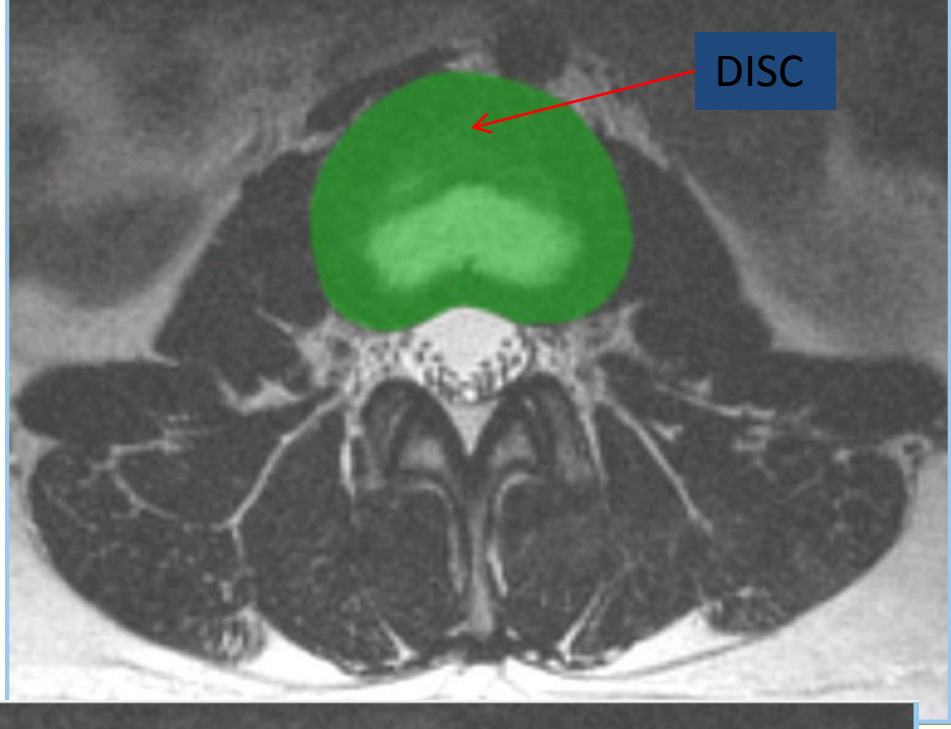
STRUCTURE of Axial section film at a lumber

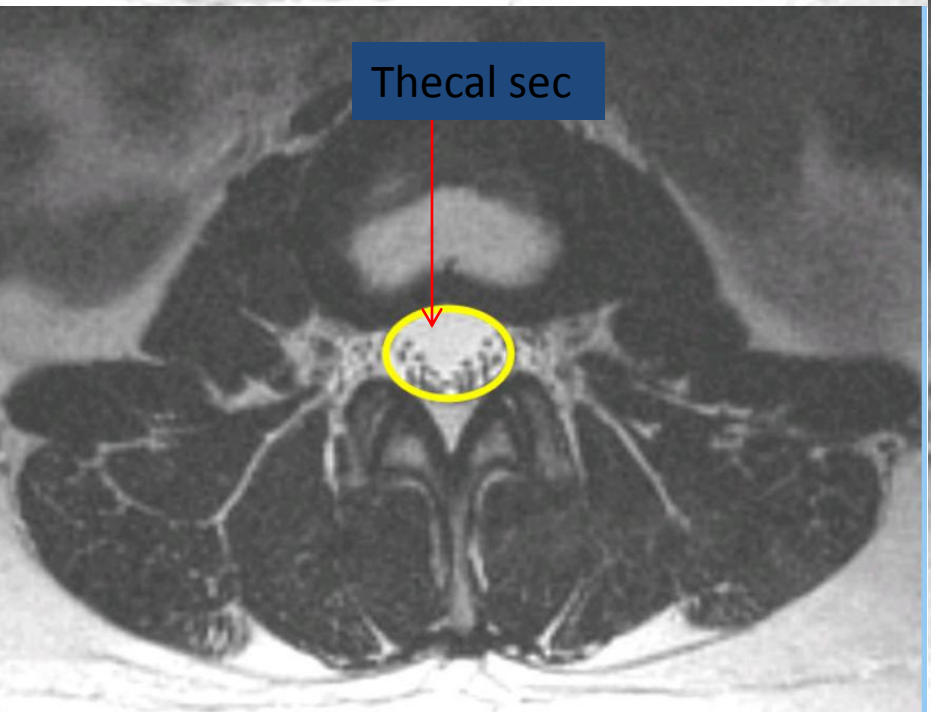


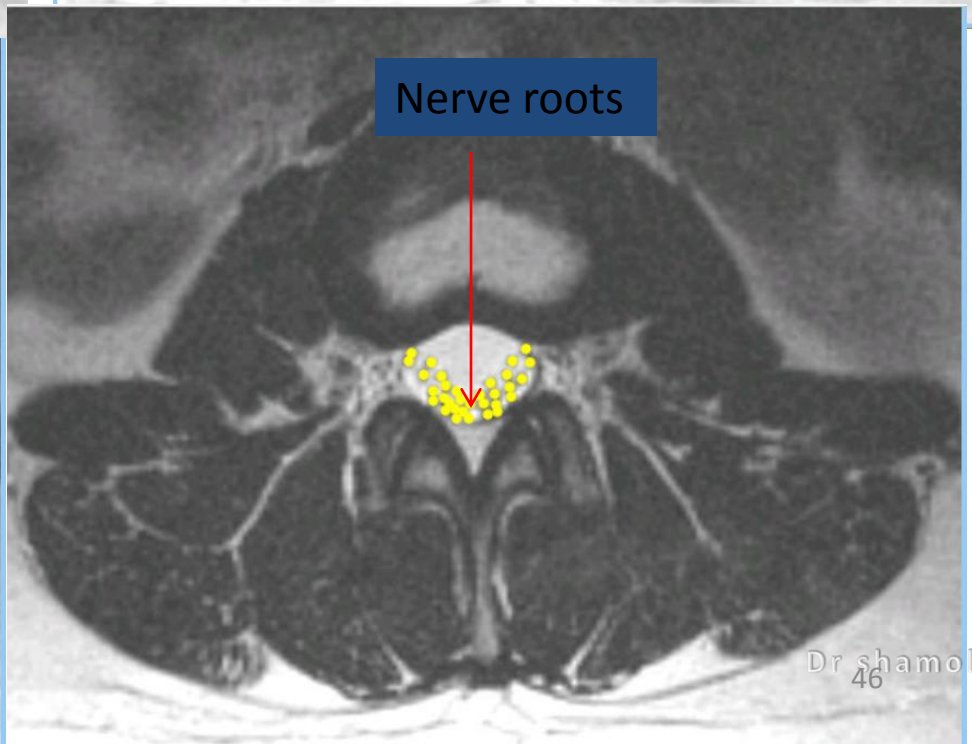
Indentify the structure at the L1-L2 disc level



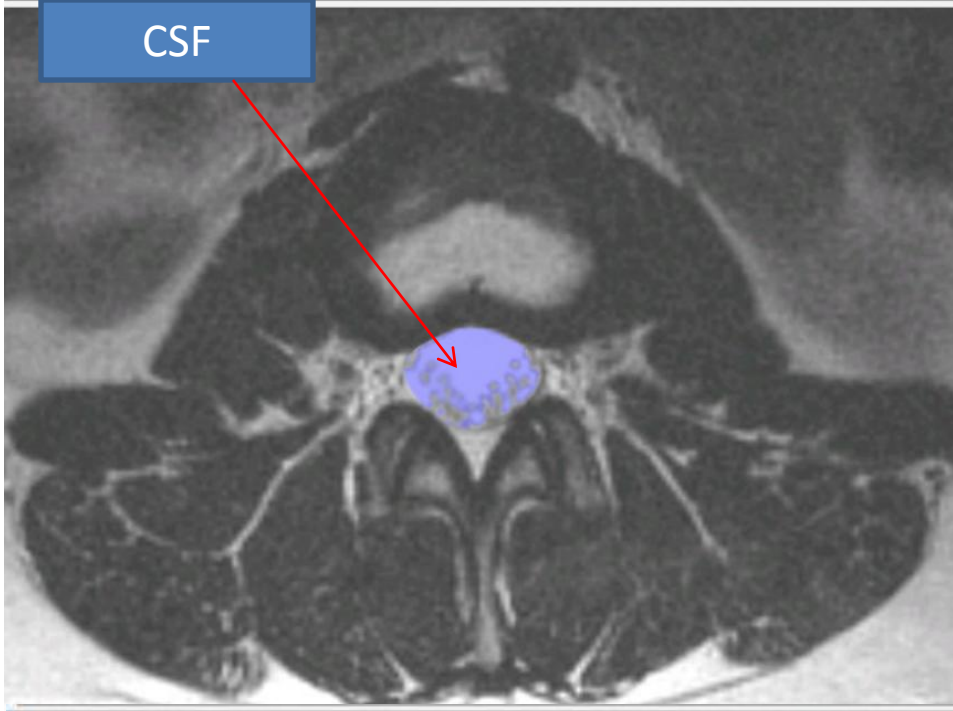


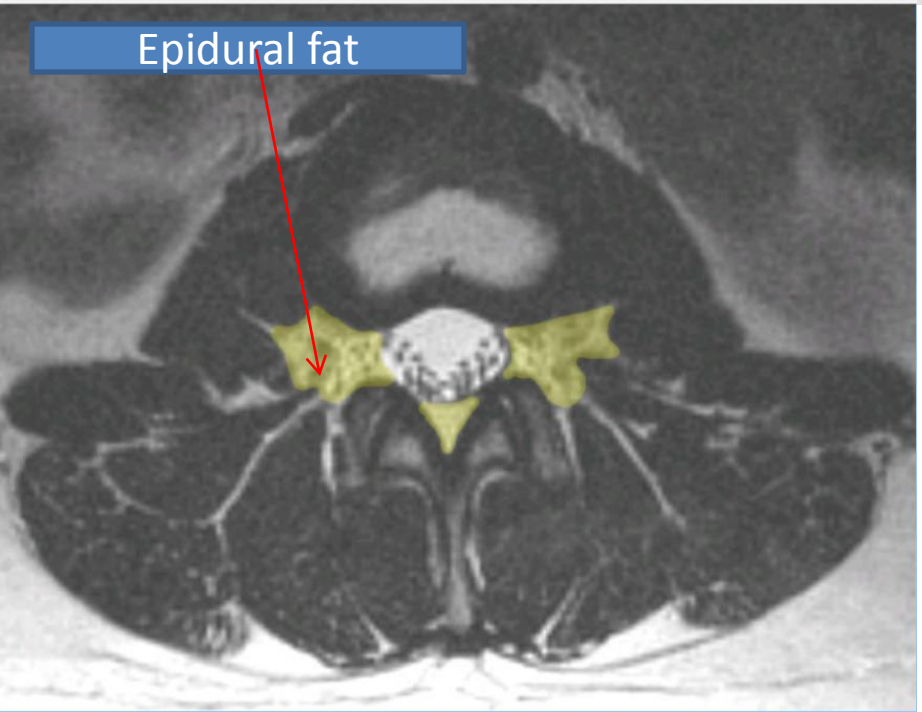

DISC

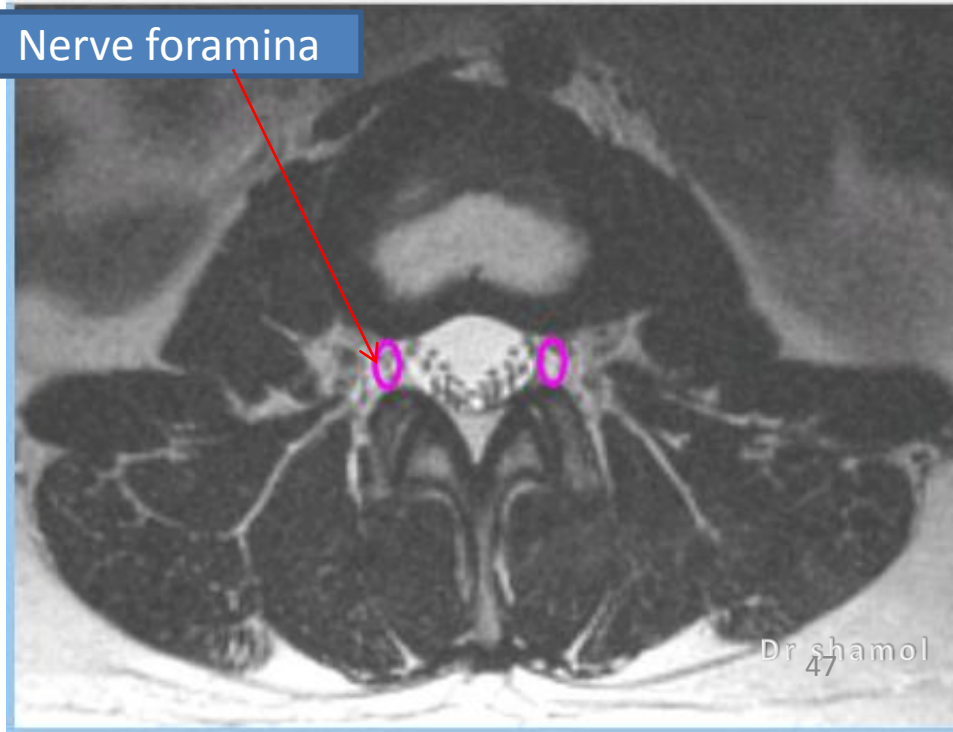

Thecal sec


Nerve roots

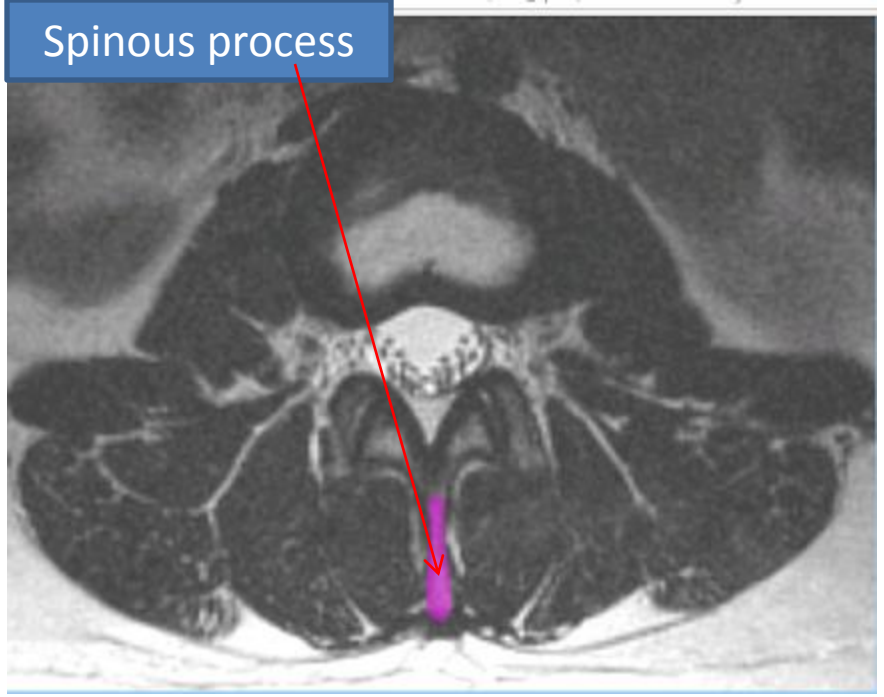


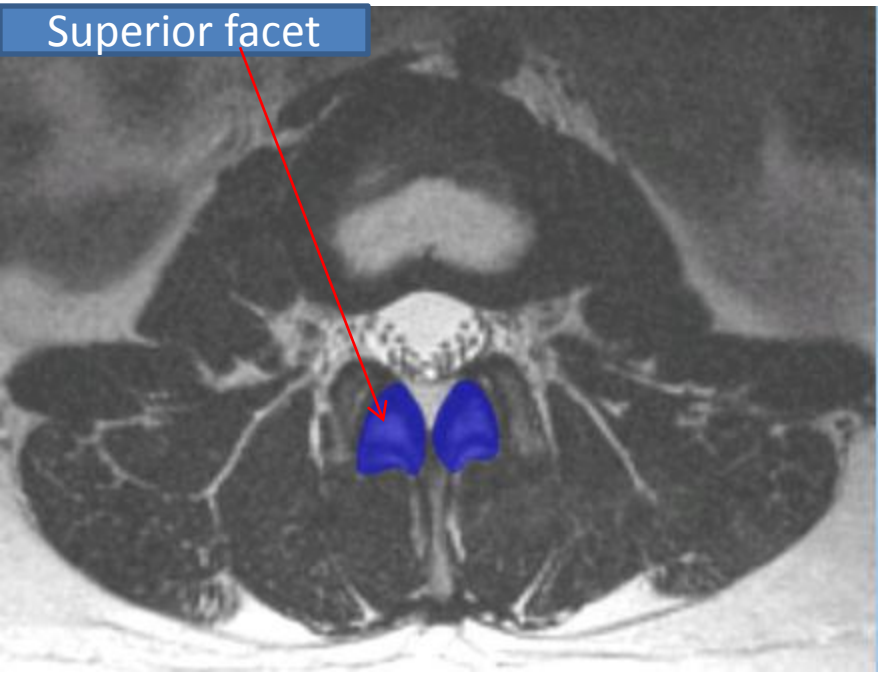

CSF

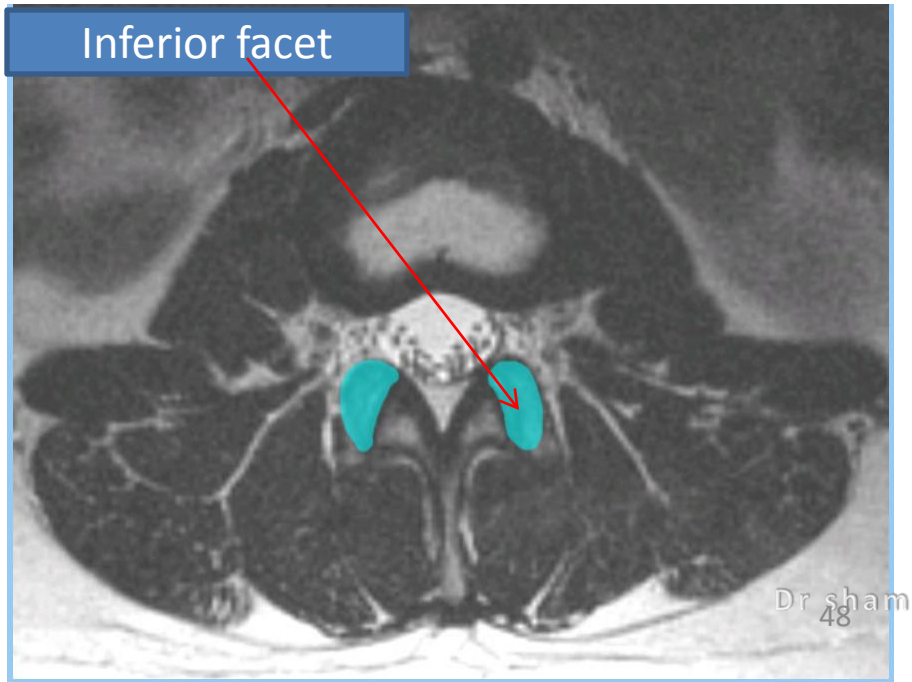

Epidural fat


Nerve foramina

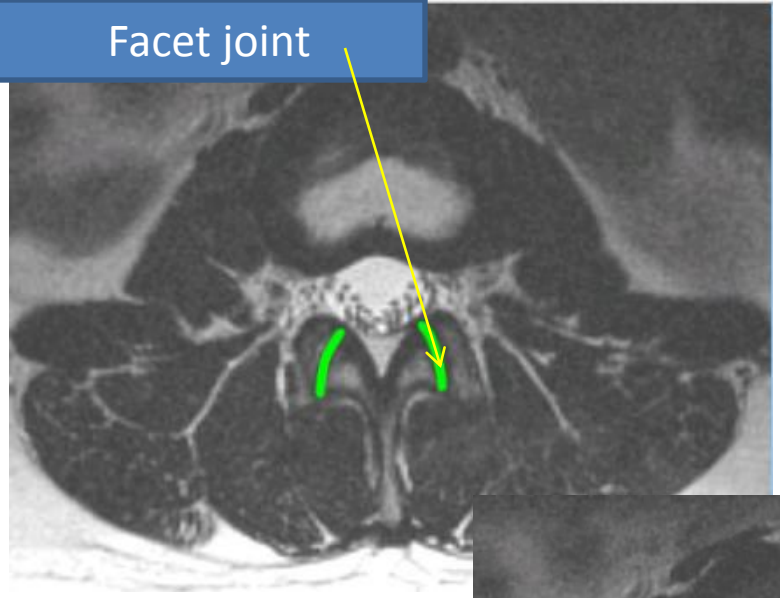



Spinous process

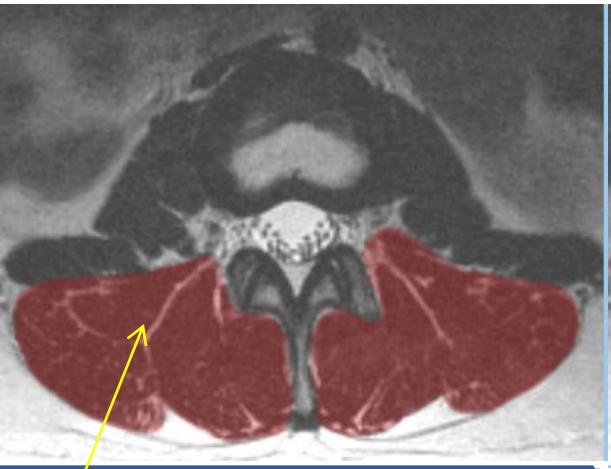

Superior facet

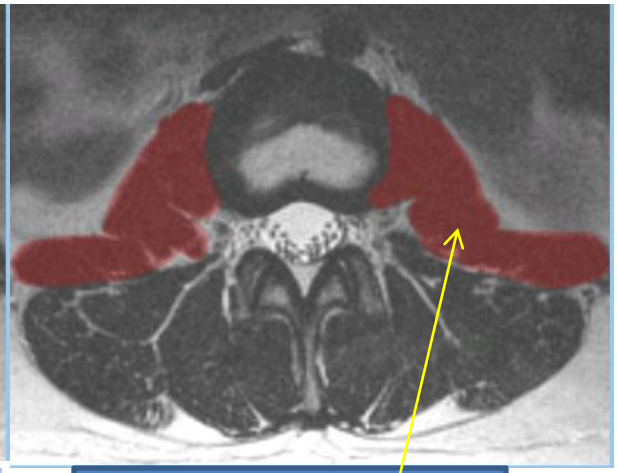

Inferior facet




Facet joint

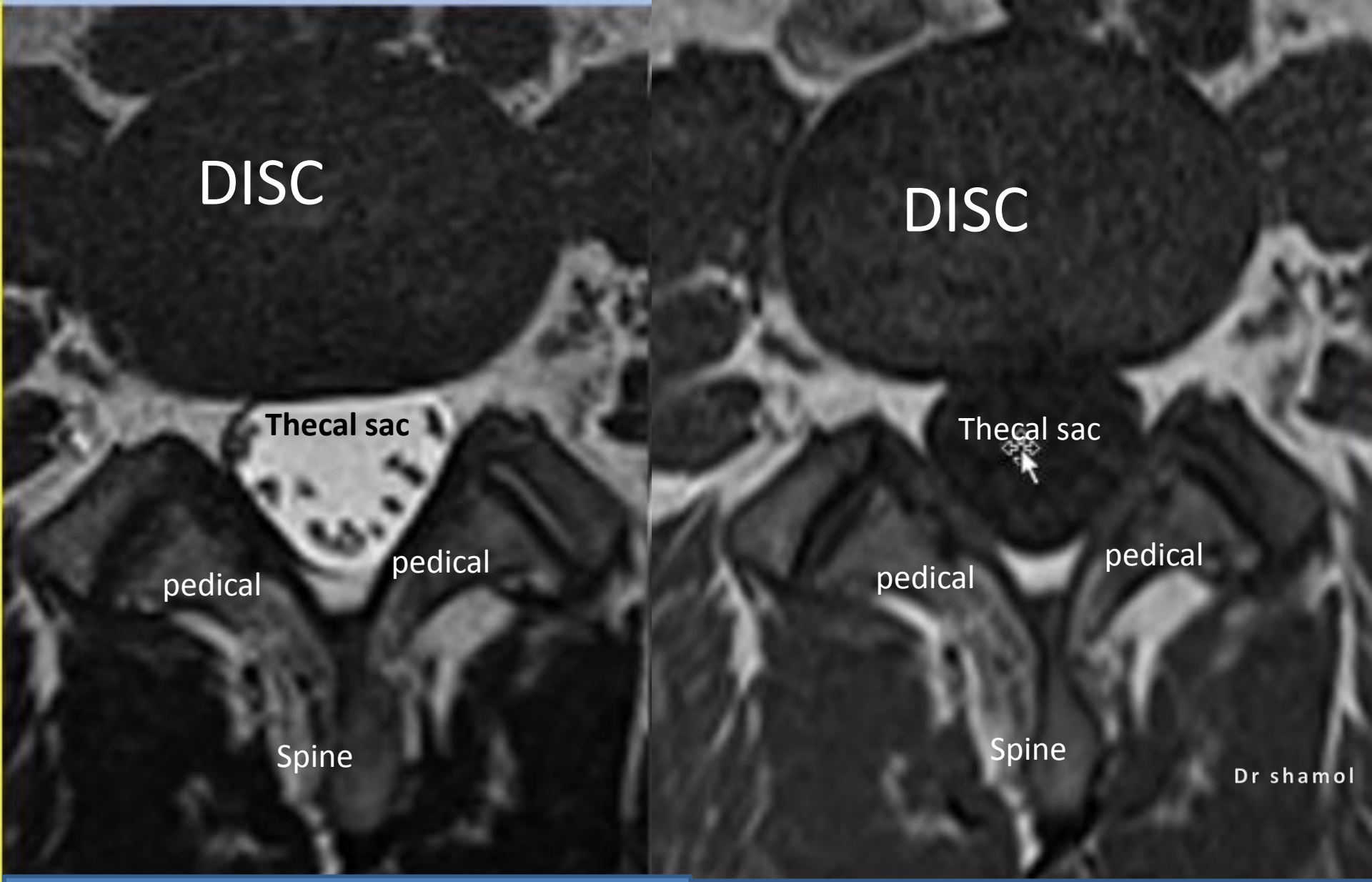

Aorta


Para spinal muscles


Iliopsoas

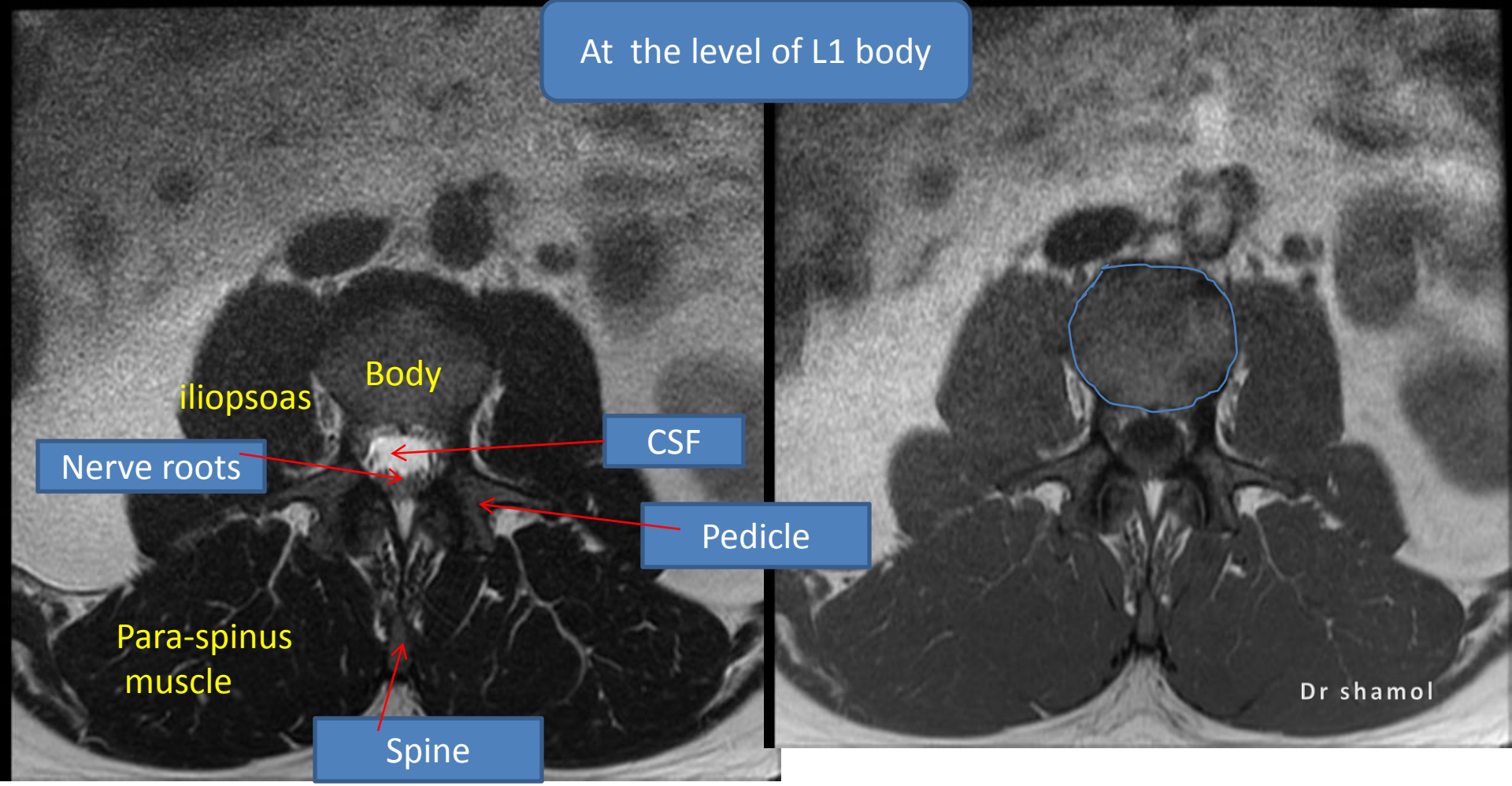

Sub-cuatneous fat
Dr shamol

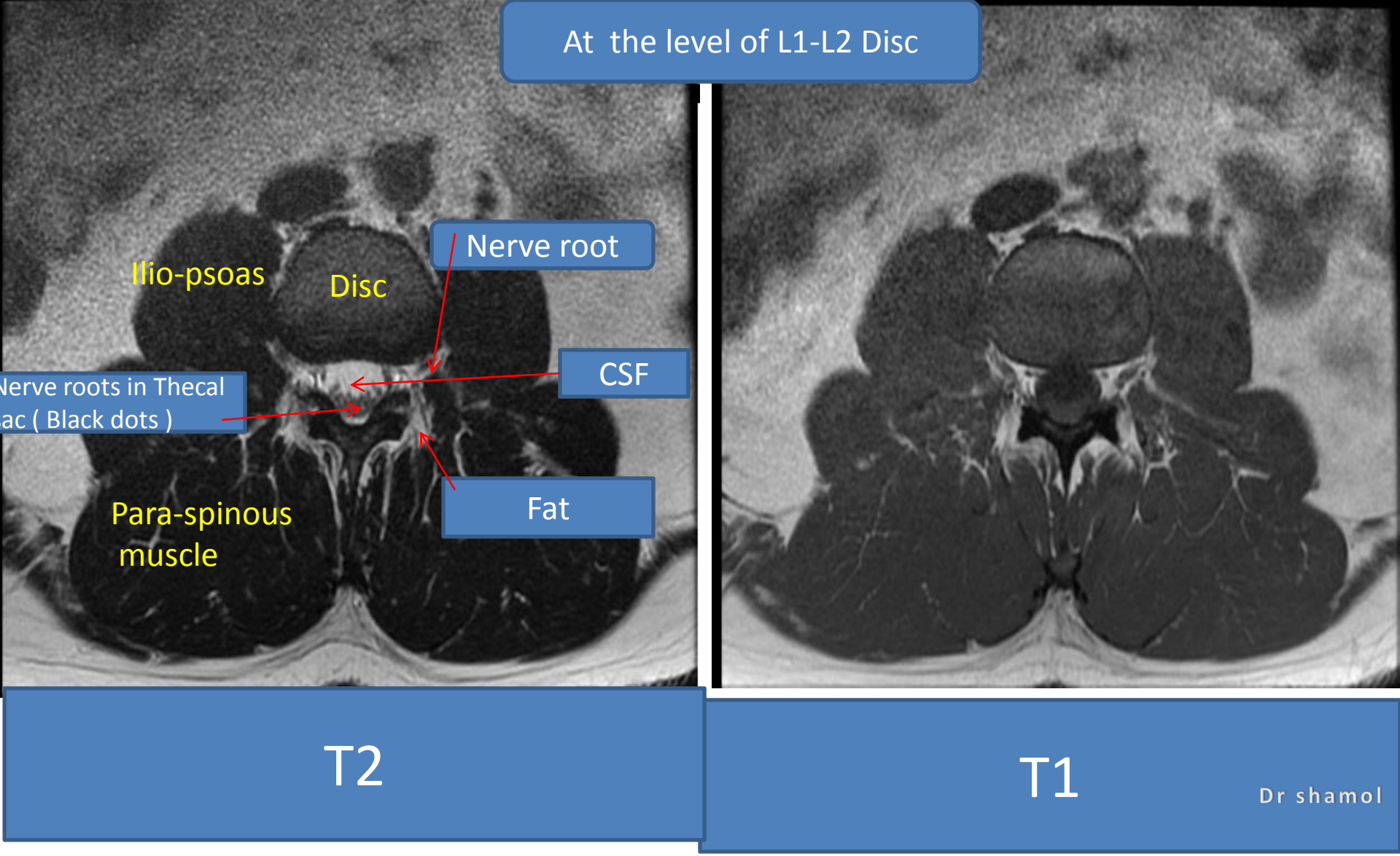
Sequence of
Axial section film at a lumber disc level
one by one

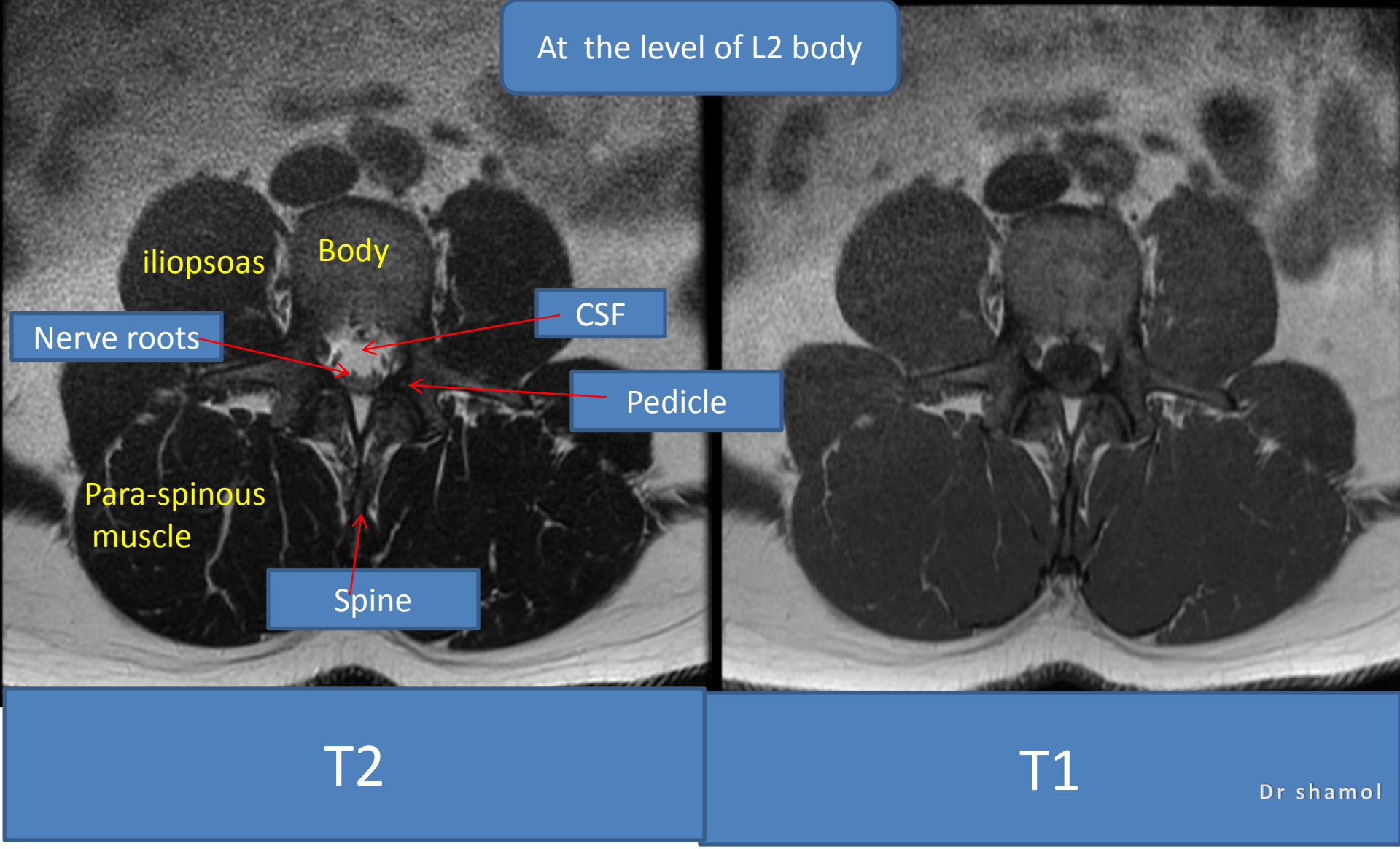

DISC
Thecal sac
pedical
pedical
Spine
DISC
Thecal sac
pedical
pedical
Spine
Dr shamol

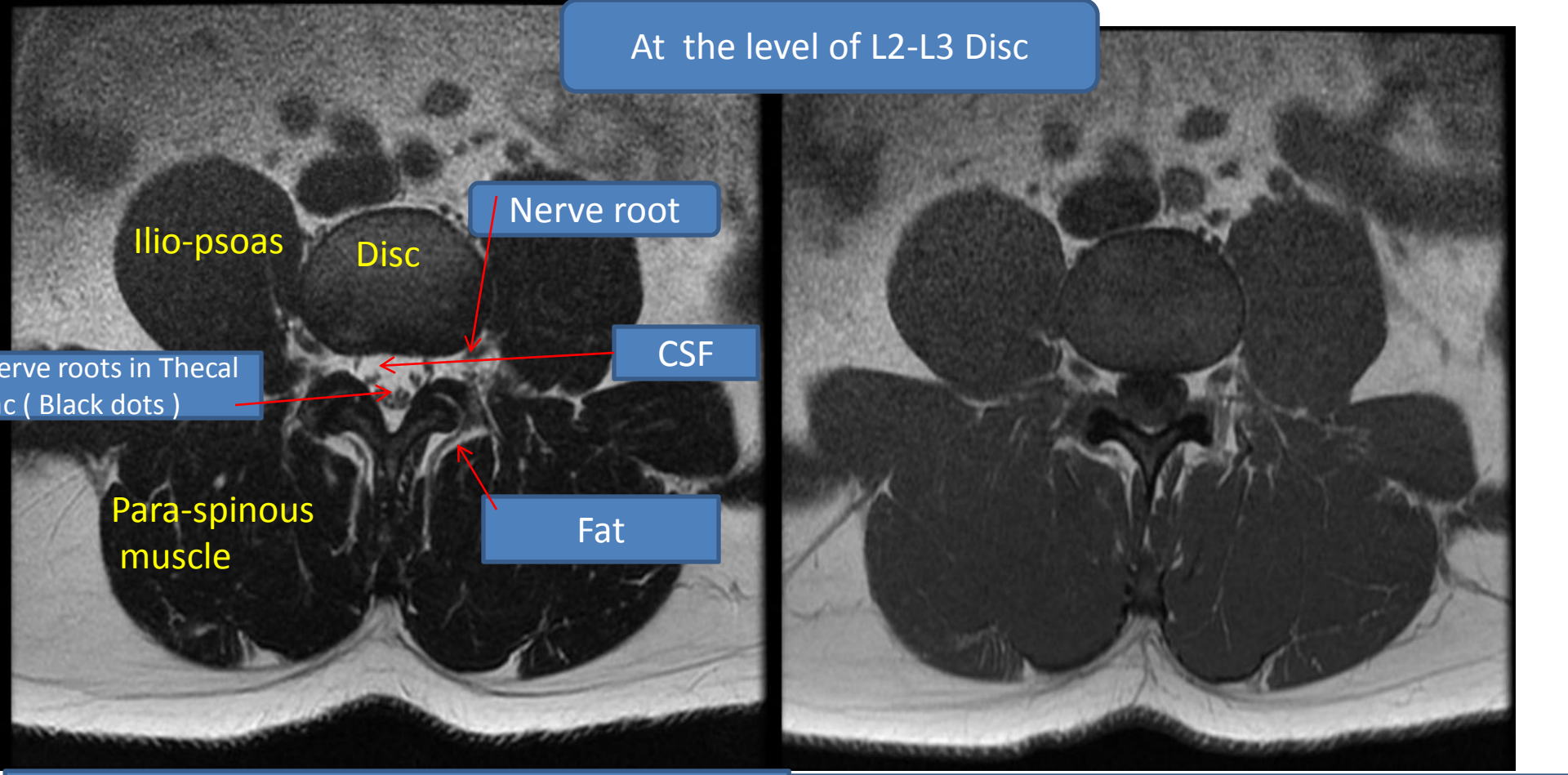
T2

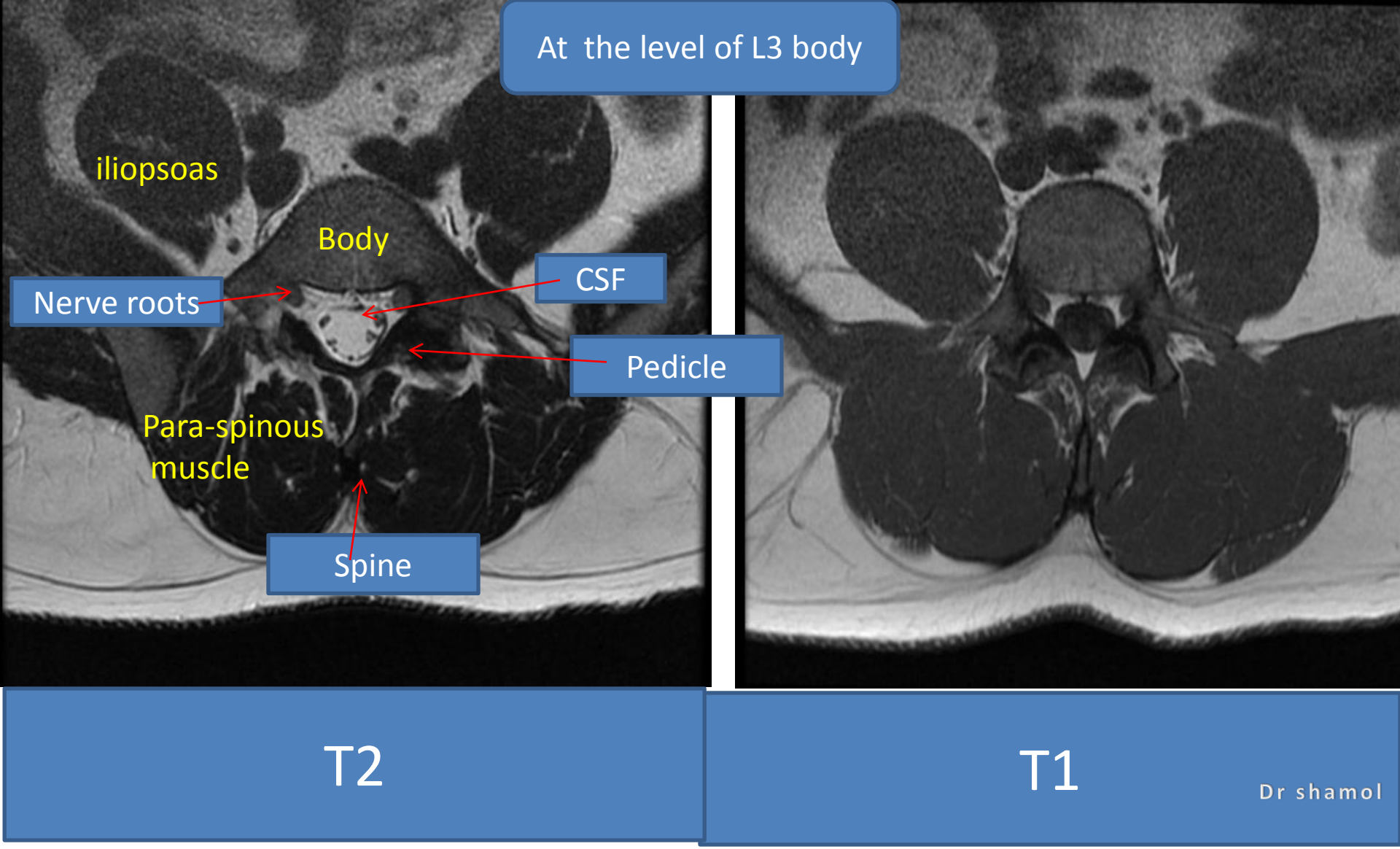
T1


At the level of L1 body
Body
iliopsoas
Nerve roots
CSF
Pedicle
Para-spinus muscle
Spine
Dr shamol
T2
T1

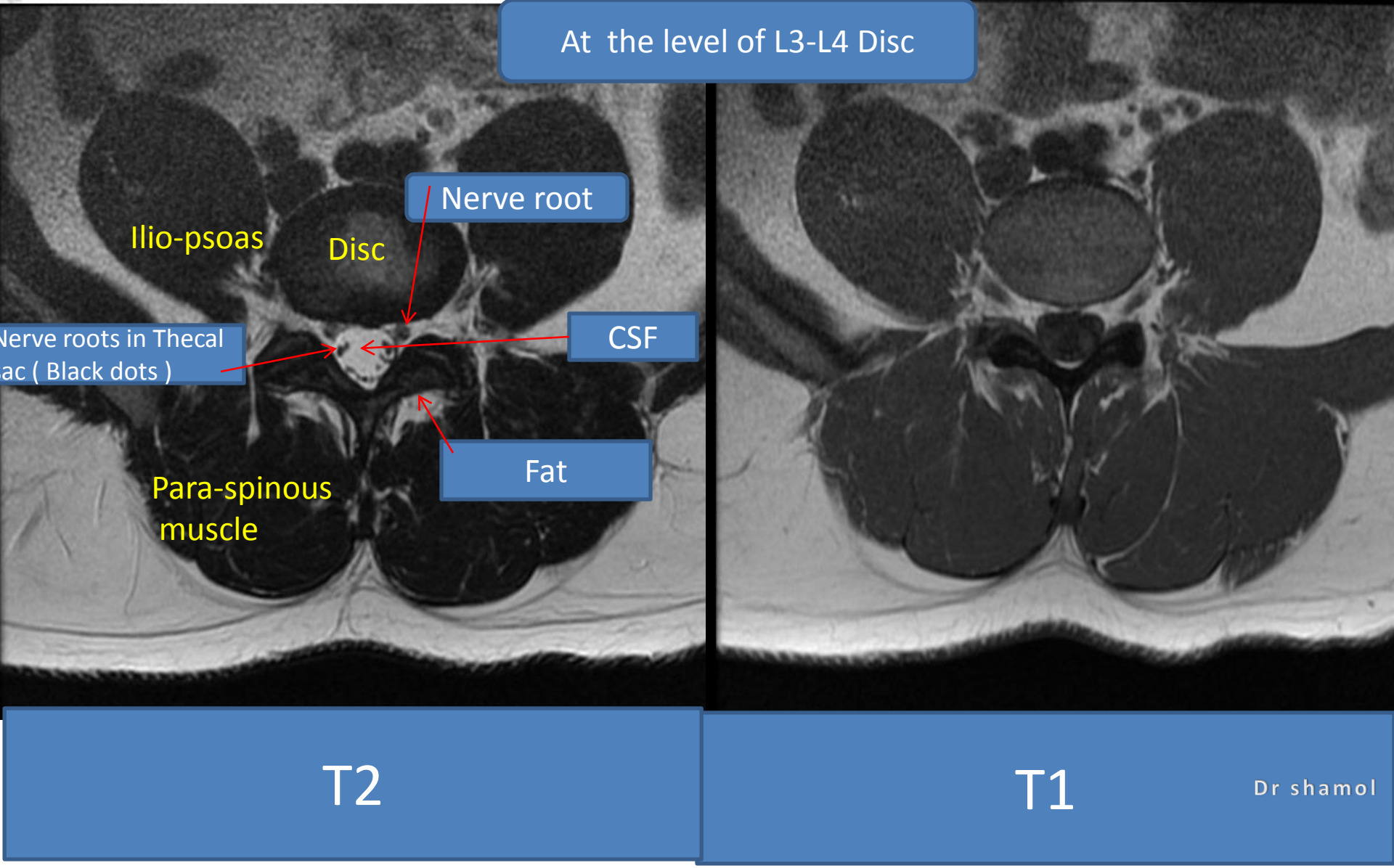

At the level of L1-L2 Disc
Nerve root
Ilio-psoas
Disc
CSF
Nerve roots in Thecal
ac (Black dots)
Fat
Para-spinous
muscle
T2
T1
Dr shamol

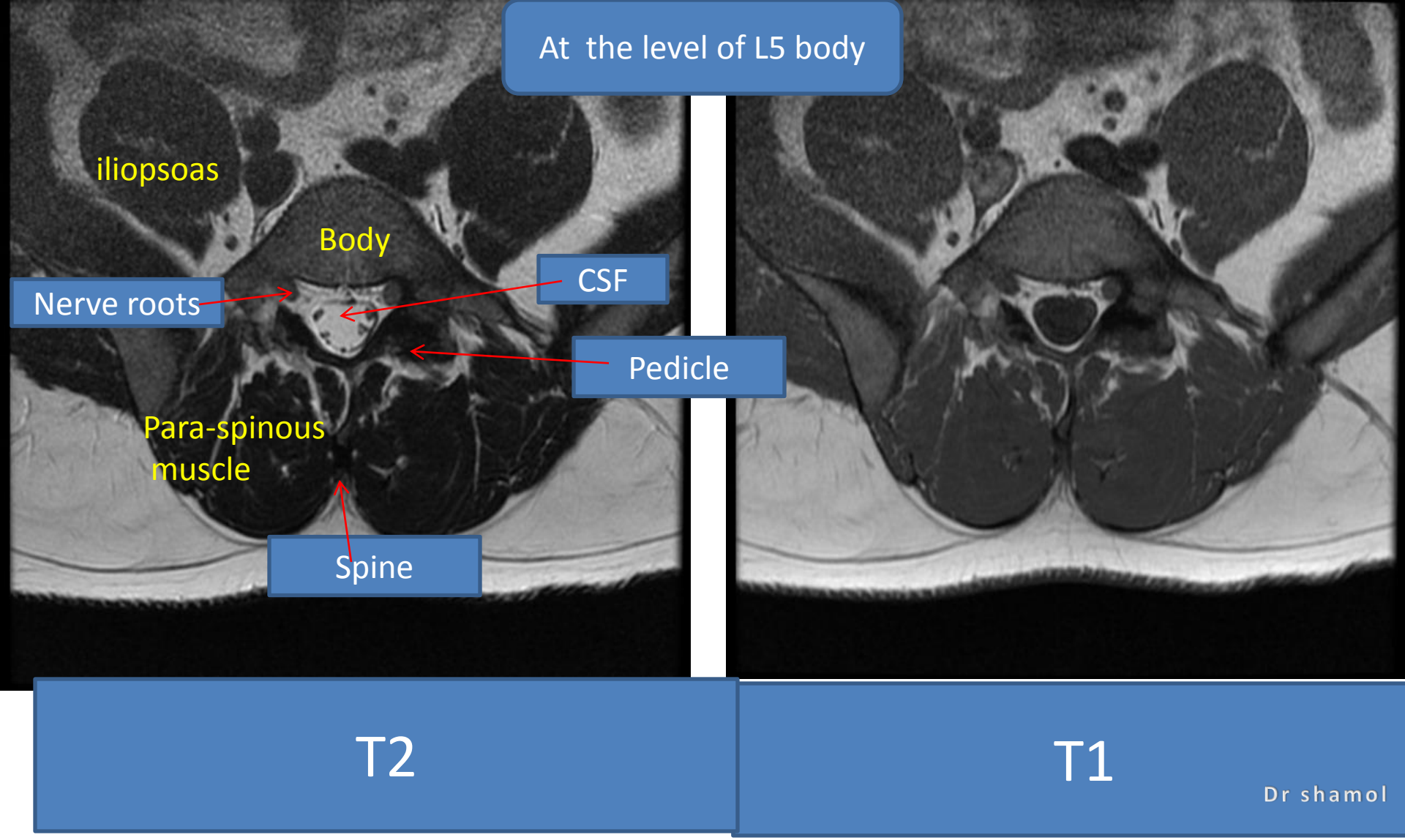

At the level of L2 body
iliopsoas
Body
CSF
Nerve roots
Pedicle
Para-spinous muscle
Spine
T2
T1
Dr shamol


At the level of L2-L3 Disc
Nerve root
Ilio-psoas
Disc
CSF
erve roots in Thecal
c (Black dots)
Para-spinous
muscle
Fat
T2
T1
Dr shamol

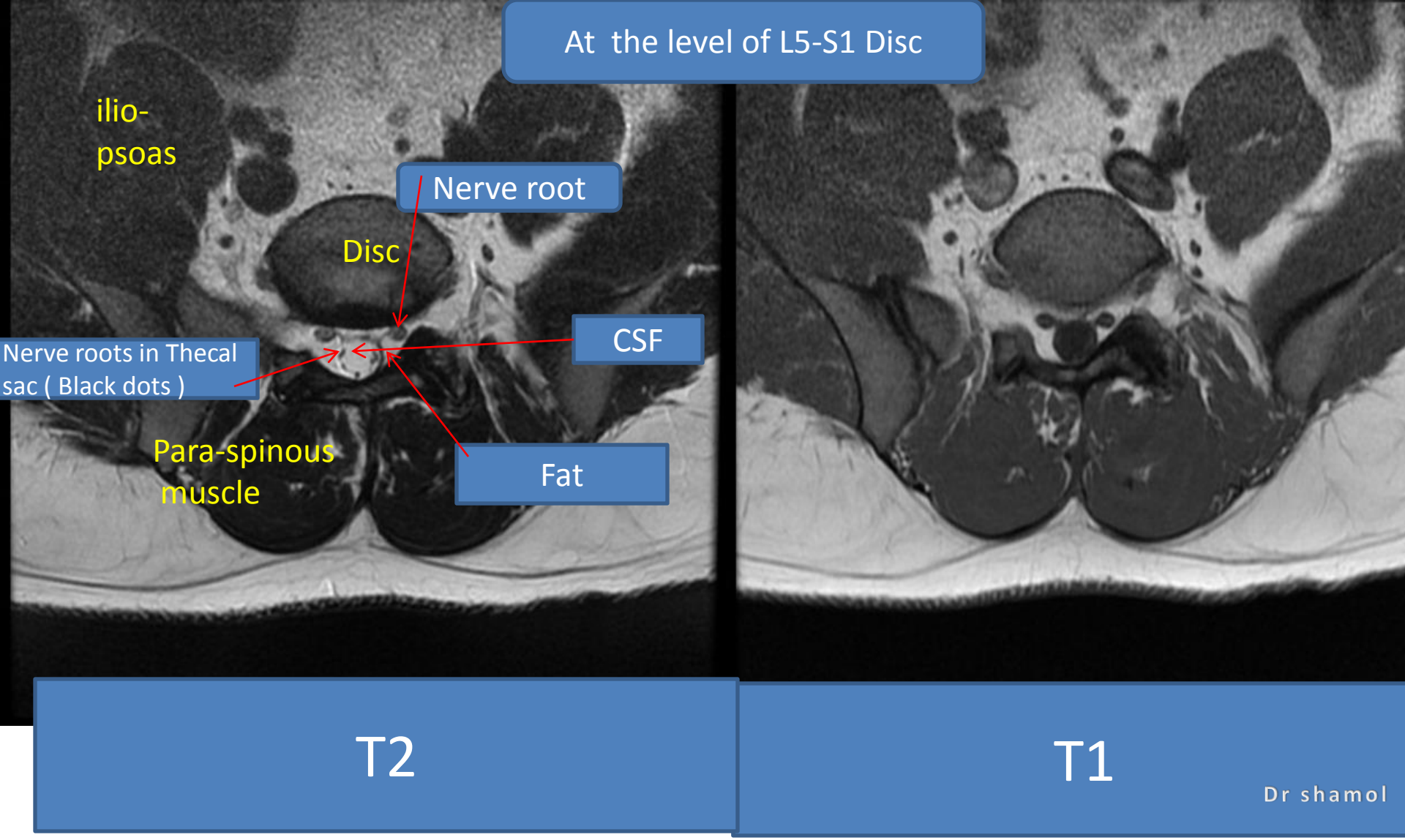

At the level of L3 body
iliopsoas
Body
Nerve roots
CSF
Pedicle
Para-spinous muscle
Spine
T2
T1
Dr shamol

Dr shamol

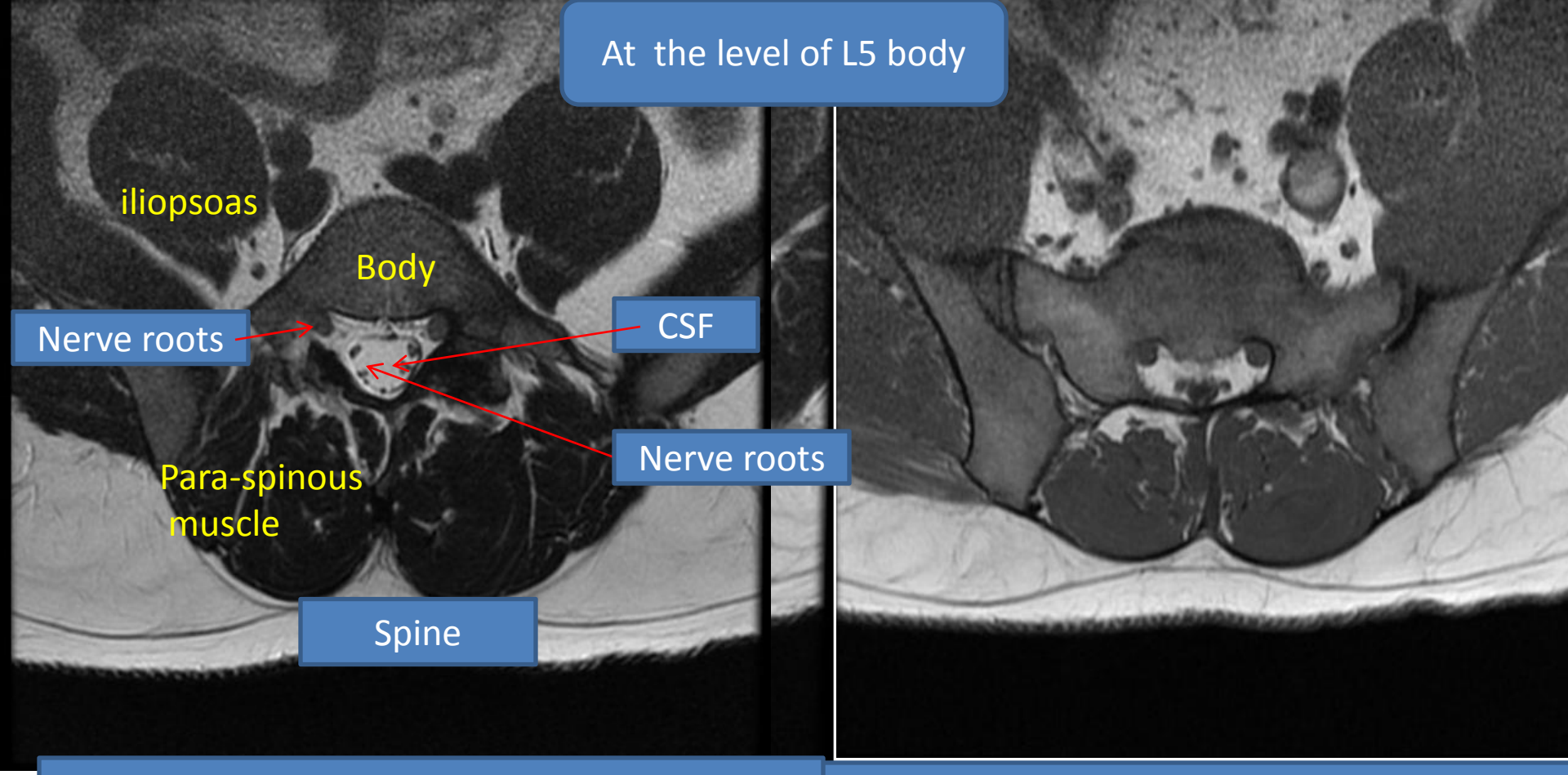

At the level of L3-L4 Disc
Nerve root
Ilio-psoas
Disc
Nerve roots in Thecal ac (Black dots)
CSF
Fat
Para-spinous muscle
T2
T1
Dr shamol


At the level of L5 body
iliopsoas
Body
Nerve roots
CSF
Pedicle
Para-spinous muscle
Spine
T2
T1
Dr shamol

Dr shamol


At the level of L5-S1 Disc
ilio-
psoas
Nerve root
Disc
CSF
Nerve roots in Thecal sac (Black dots)
Para-spinous muscle
Fat
T2
T1
Dr shamol

Dr shamol


At the level of L5 body
iliopsoas
Body
Nerve roots
CSF
Nerve roots
Para-spinous muscle
Spine
T2
T1
Dr shamol



T2



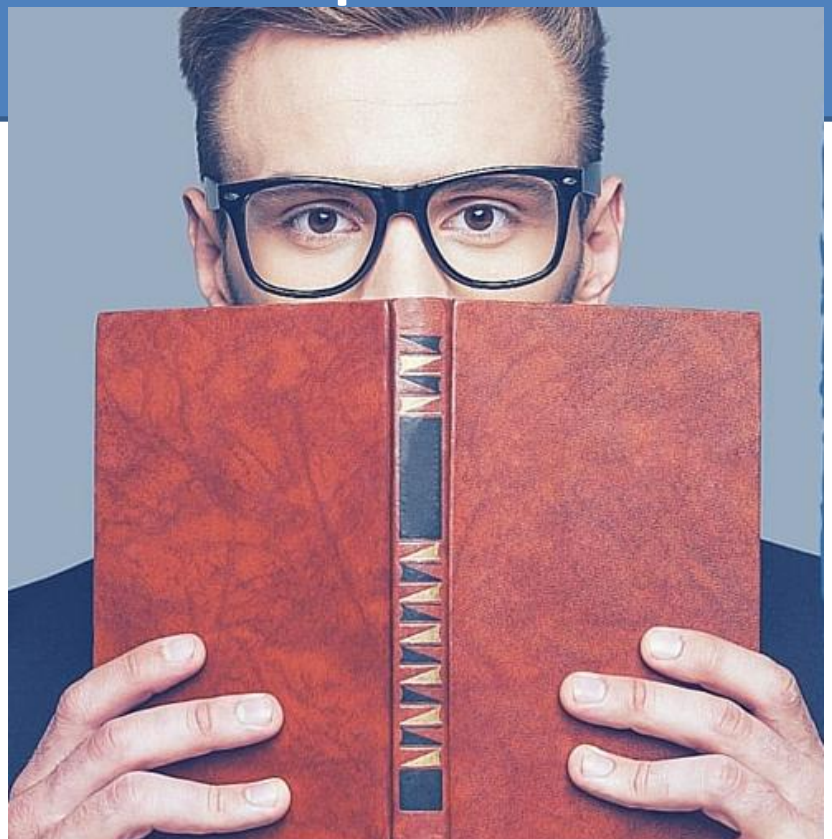
T1

Dr shamol

Dr shamol

Section 2

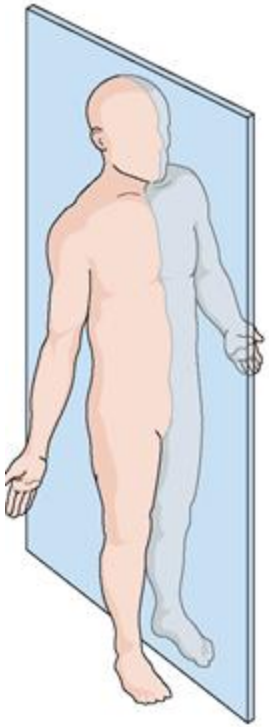
How
To read
MRI of
LS spine film



T1

T2

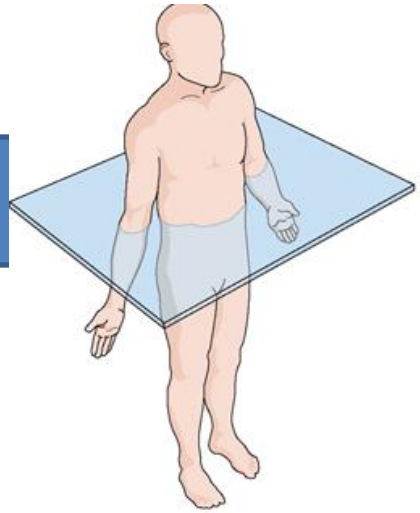
2 sagittal film



T1

T2

2 Axial film



T 1 SAGITTAL FILM

Dr shamol

❖Sagittal film
❖T1 (as CSF is black)
❖10 snap in one film
❖Large one is mid sagital
❖Other 9 /6 para sagital snaps are taken
❖ they are taken Sequentially from one side to another (e.g. right to left)



Bottom and right side of each para-sagital snap there is a window Which indicate the level of snap taken

Dr shamol

Mid-sagittal

para-sagittal



Conus medullaris

Spinal cord

T12

Disc-T12-L1

Ligamenta flava

L1

CSF

Disc-L1-2

Post longitudinal ligament

L2

Disc-L2-3

Ant. Longitudinal ligament

Spinous process

L3

Disc-L3-4

Inter spinous ligament

L4

Skin

DiscL4-5

L5

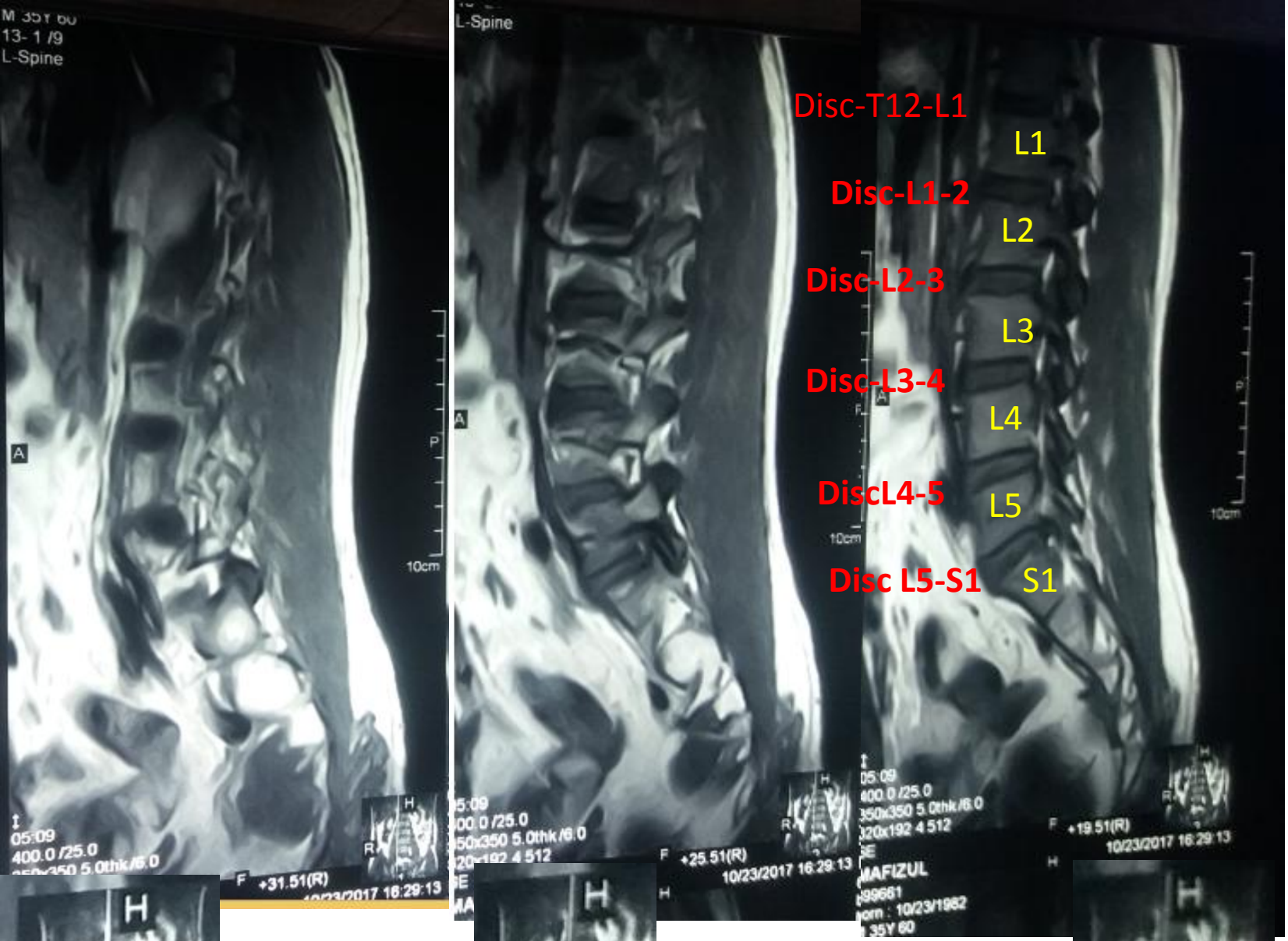
Subcutaneous fat

Disc L5-S1

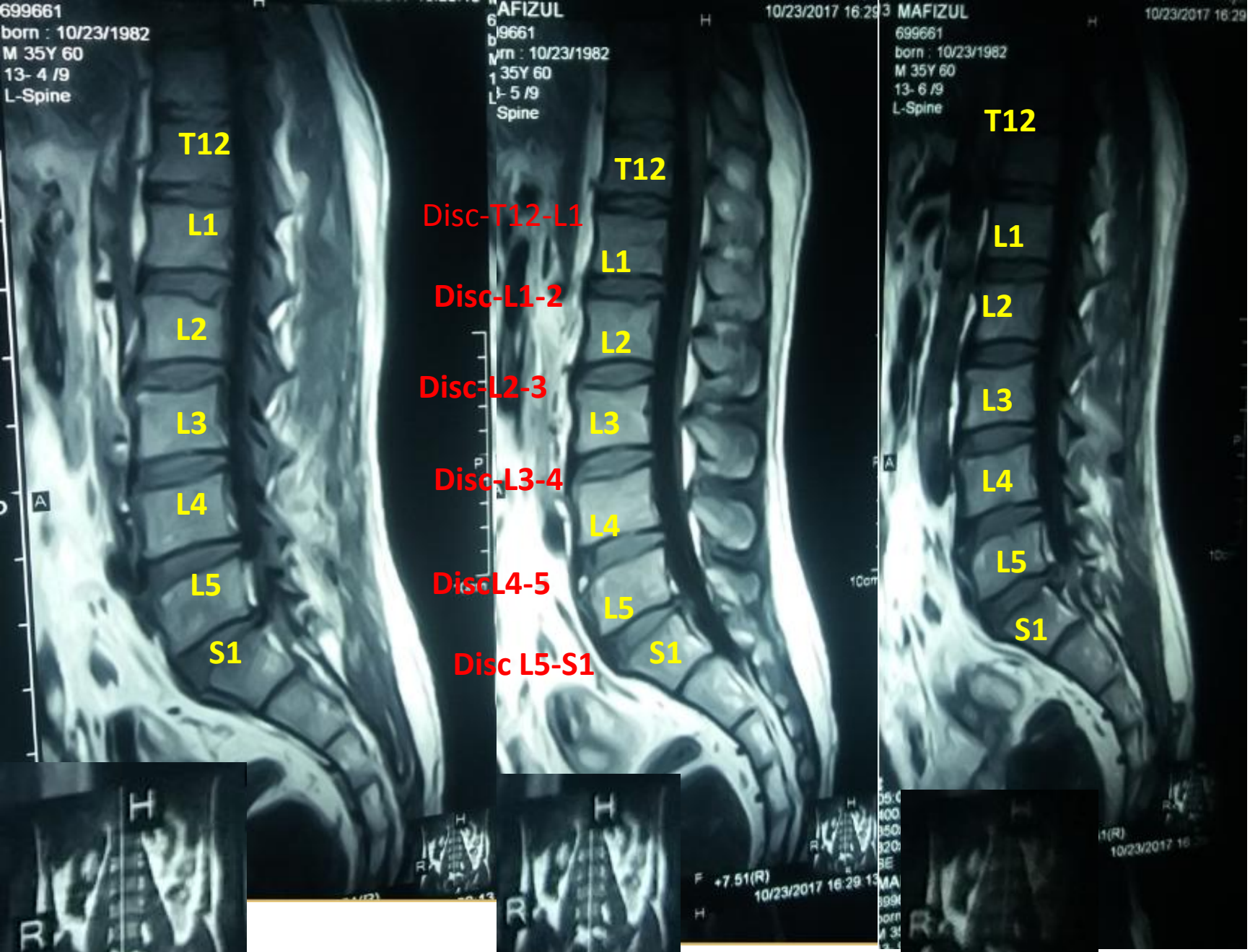
S1

Mid-sagittal

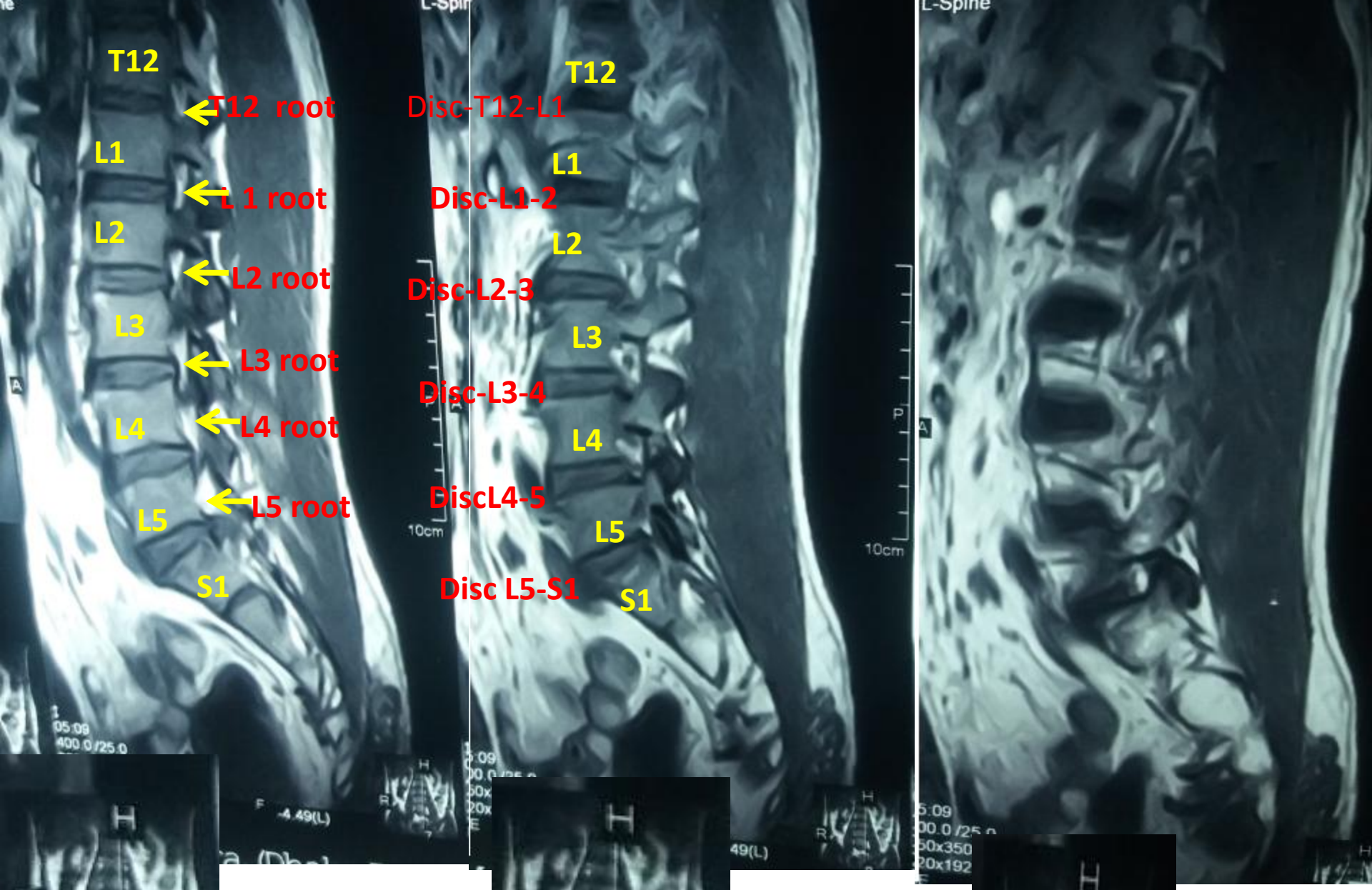
Dr shamol



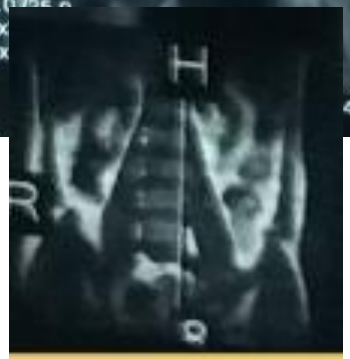
para-sagittal

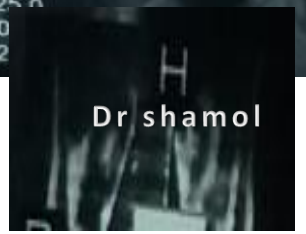


para-sagittal


T12
T12 root
L1
L 1 root
L2
L2 root
L3
L3 root
L4
L4 root
L5
L5 root
S1
T12
Disc-T12-L1
L1
Disc-L1-2
L2
Disc-L2-3
L3
Disc-L3-4
L4
DiscL4-5
L5
Disc L5-S1
S1
10cm
10cm
L-Spine
L-Spine






Dr shamol

T 2 SAGITTAL FILM

Sagittal film
T2 (as CSF is white)
10 snap in one film
Large one is mid sagital

Other 9 para sagital snaps are taken
they are taken Sequentially from one side to another (e.g. right to left)

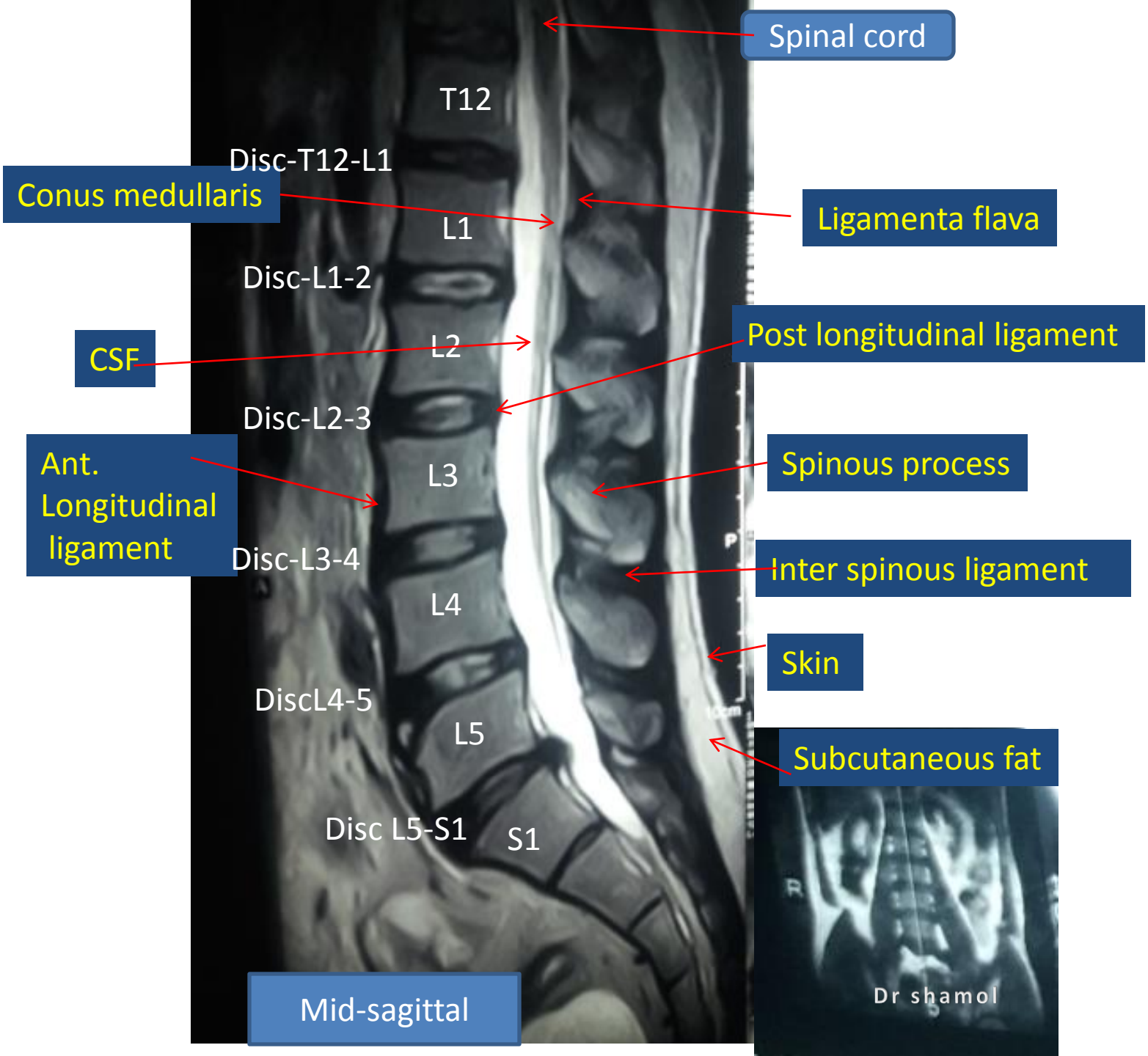


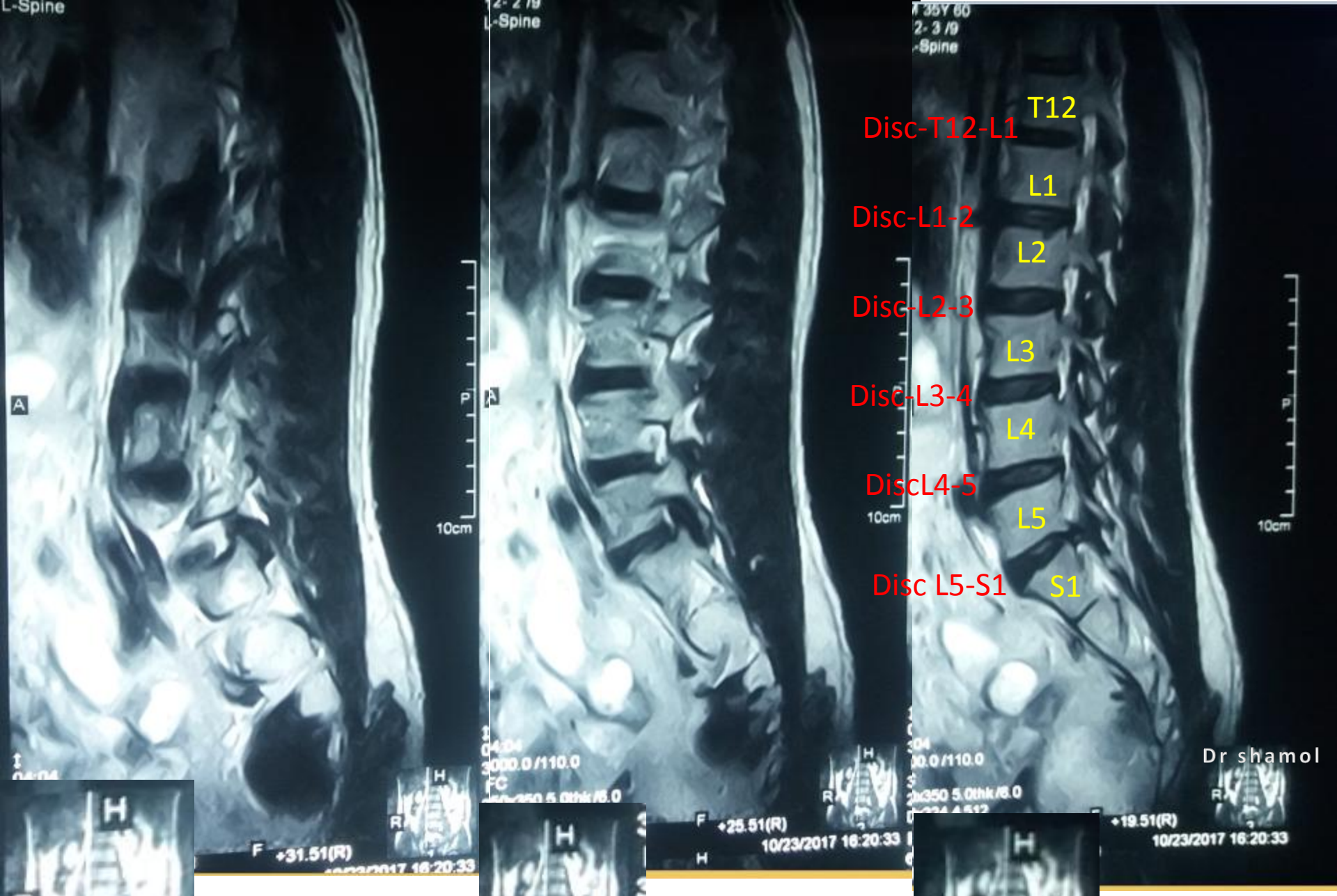
Bottom and right side of each para-sagital snap there is a window which indicate the a level snap taken

T11
T12
L1
L2
L3
L4
L5
Dr shamol

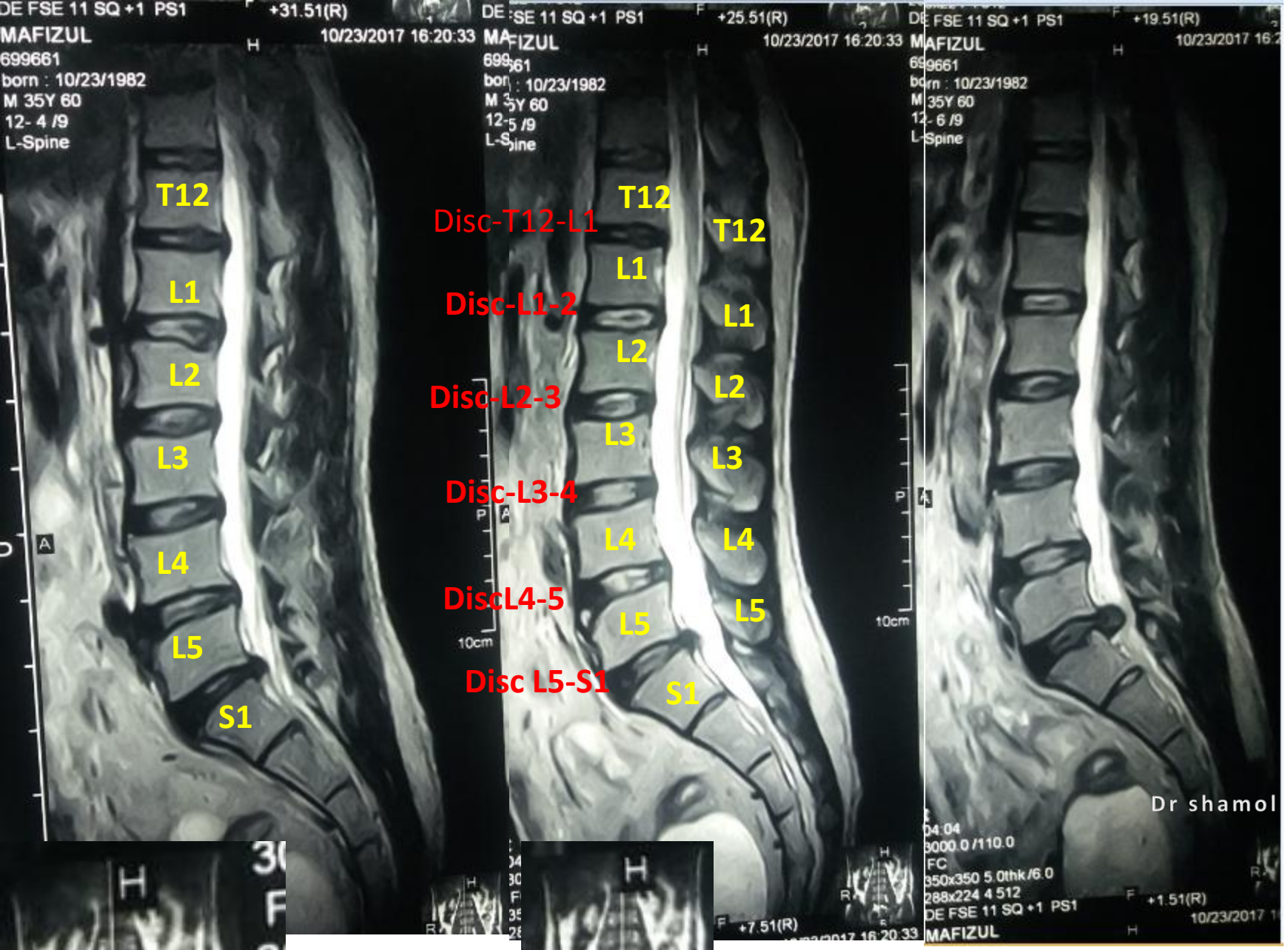
Mid-sagittal

para-sagittal

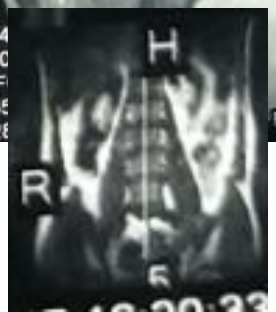

Spinal cord
T12
Disc-T12-L1
Conus medullaris
L1
Ligamenta flava
Disc-L1-2
CSF
L2
Post longitudinal ligament
Disc-L2-3
Ant.
Longitudinal
ligament
L3
Spinous process
Disc-L3-4
Inter spinous ligament
L4
Skin
DiscL4-5
L5
Subcutaneous fat
Disc L5-S1
S1
Mid-sagittal
Dr shamol



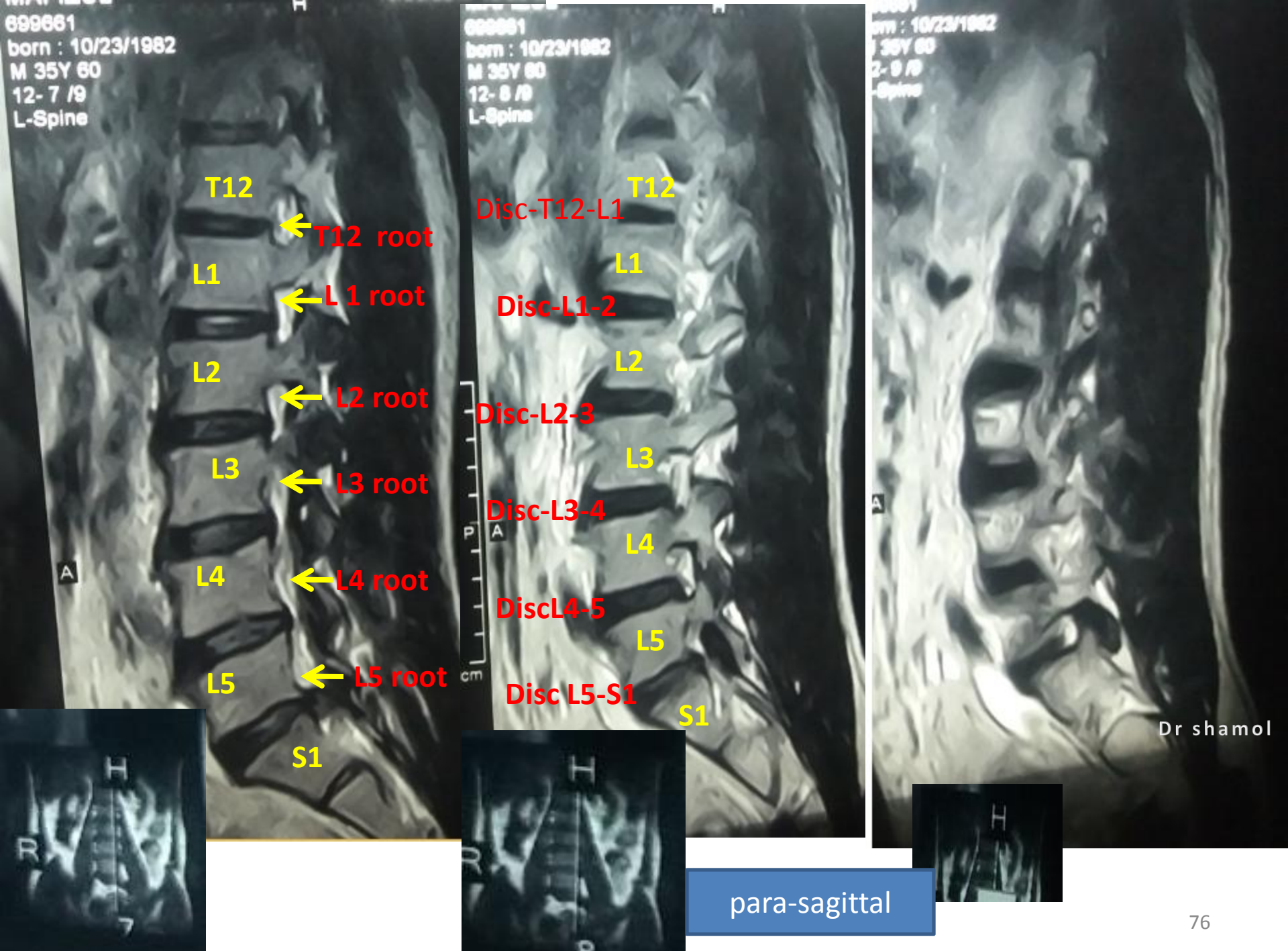
para-sagittal







para-sagittal



para-sagittal

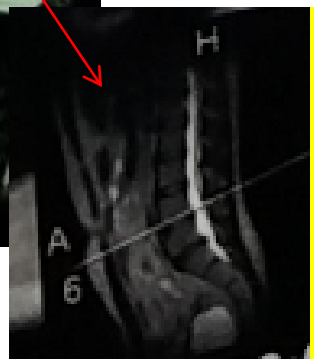
T 1 AXIAL FILM

Dr shamol

Axial film take some selected snap of At Disc level or vertebral level where pathology is suspected to see any root Compression present or not



In first sagital window there some marking (1 to 10) at which level axial snap is taken



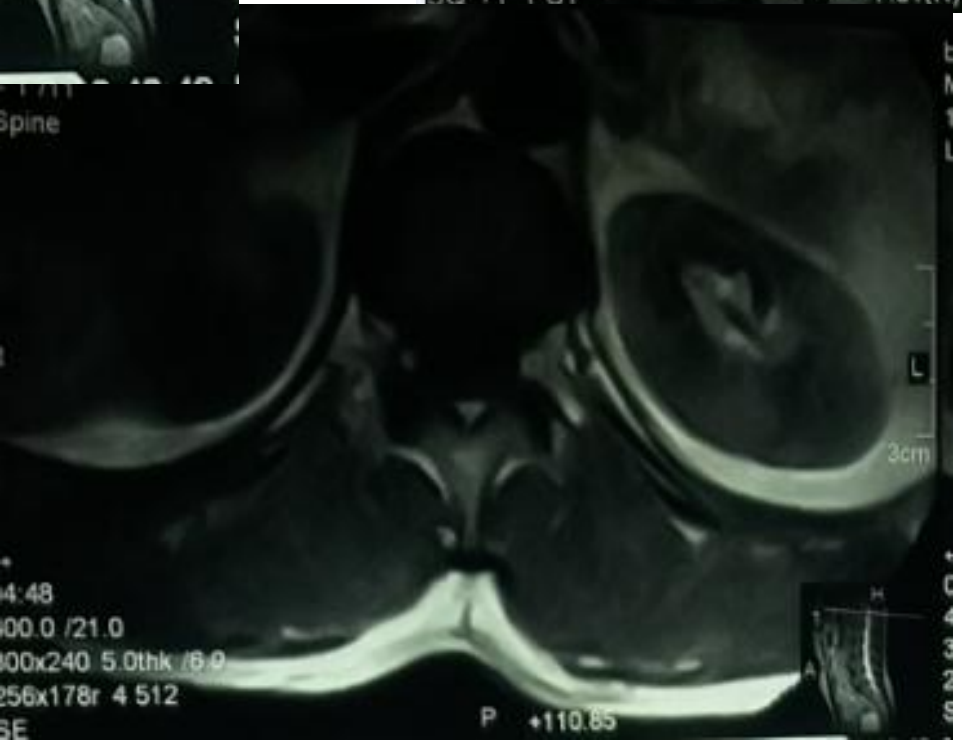
In each window of axial snap At bottom and right there is A small window of saggital Film with arrow / line mark Indication at which level section is taken

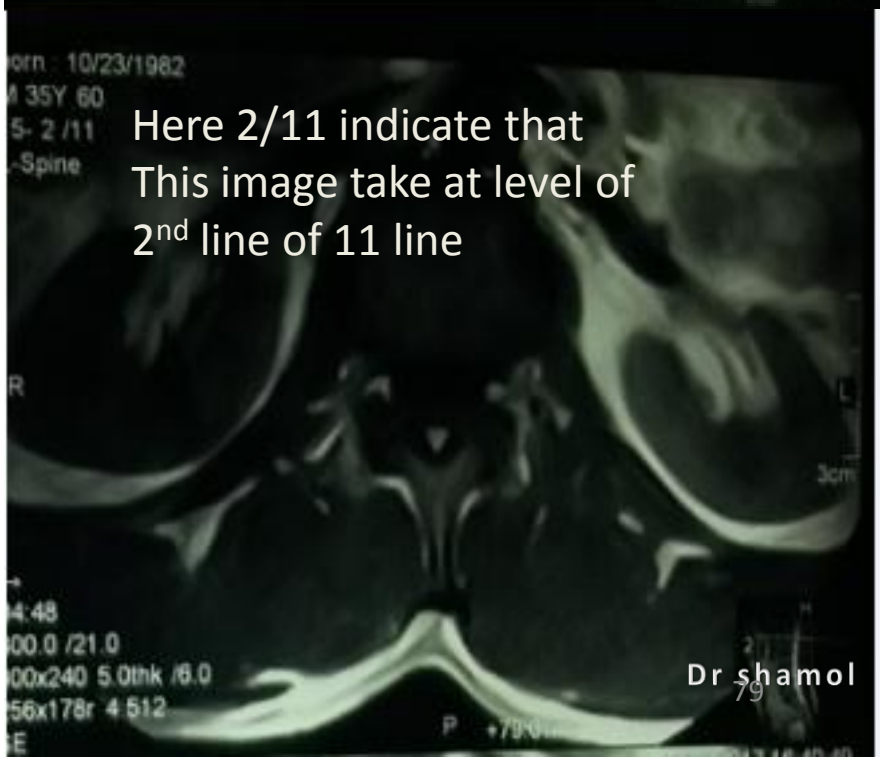


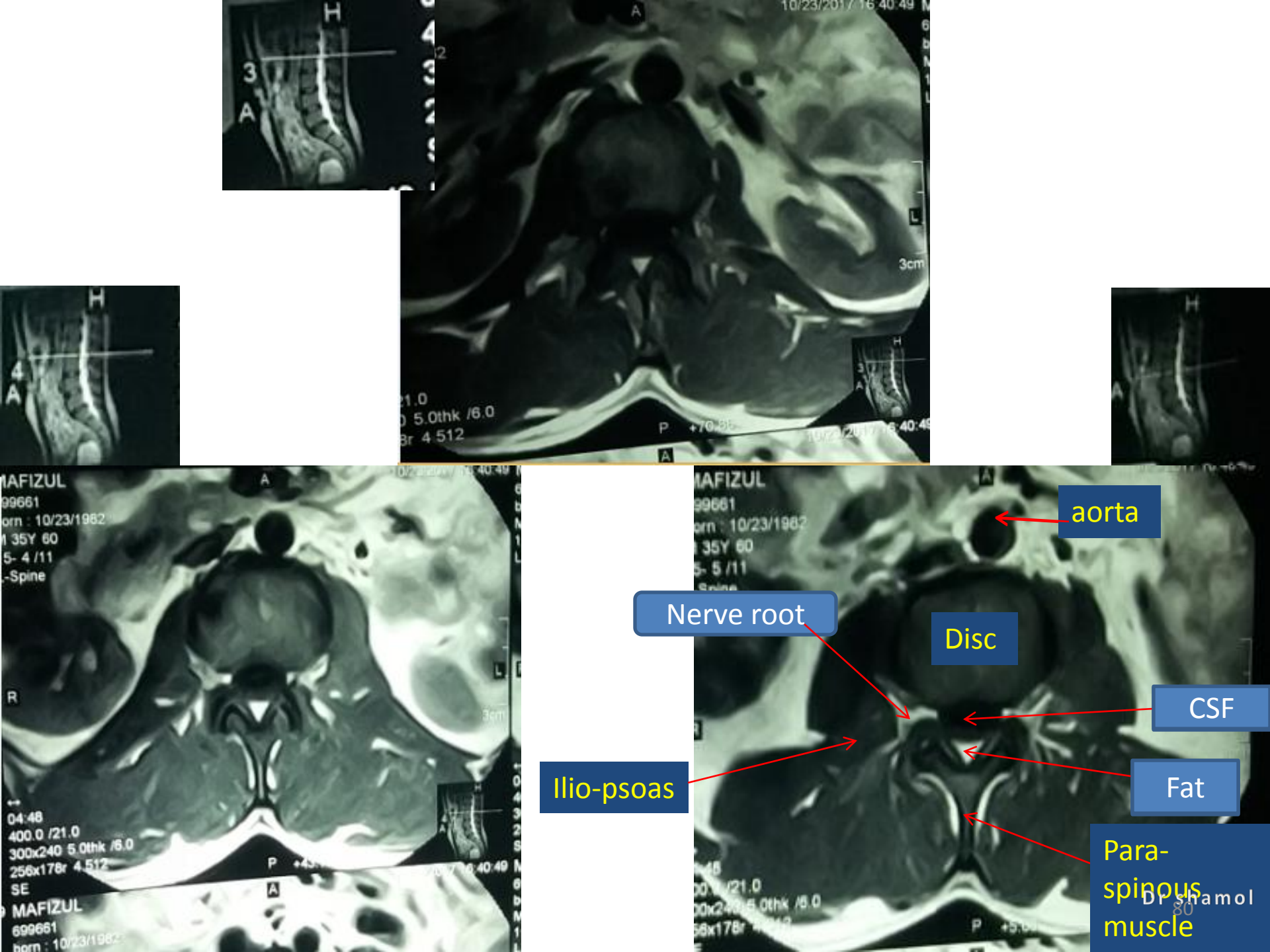


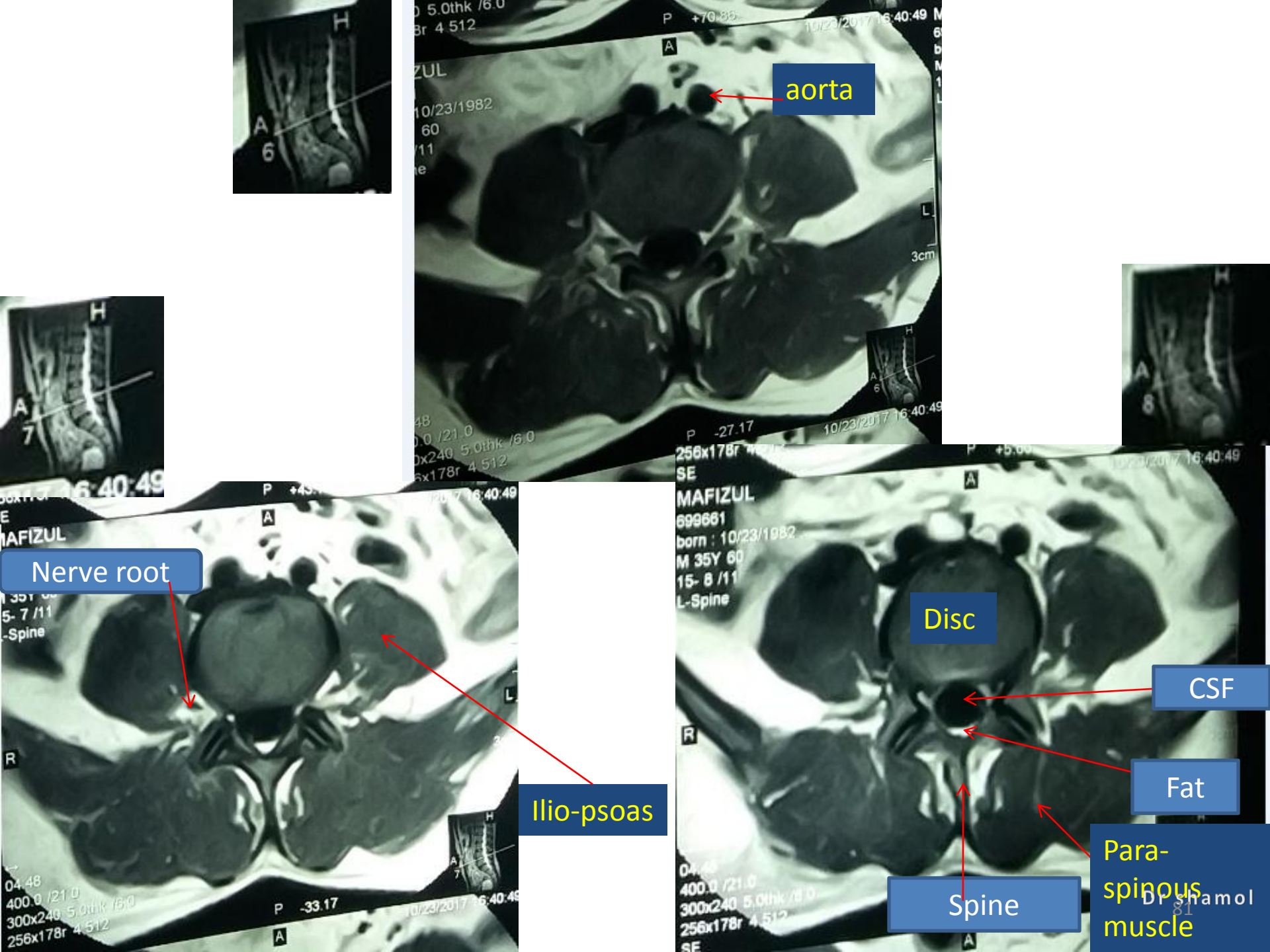
Here axial film has been at 11 level which is indicating by 11 line in first window

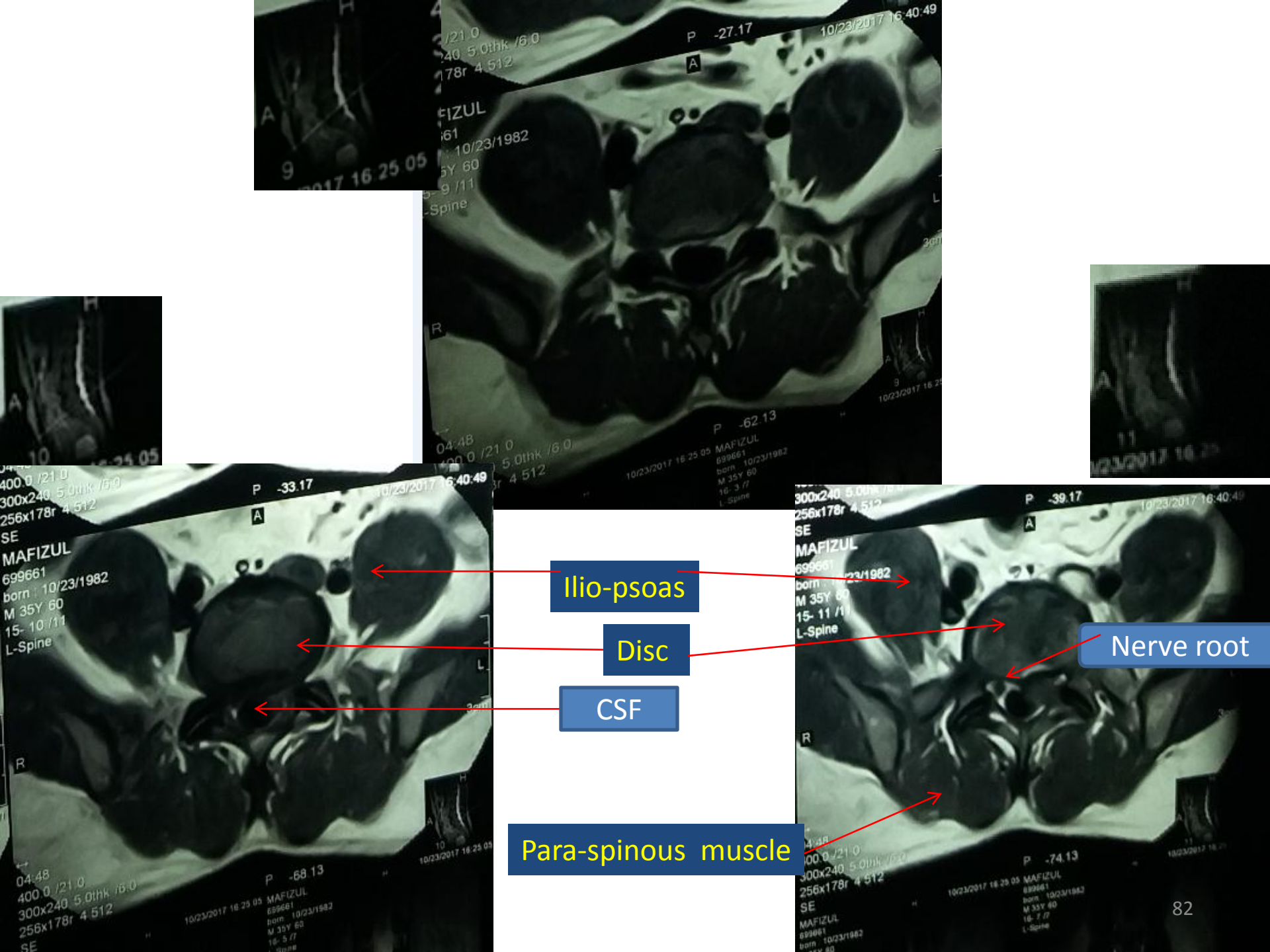







aorta
Nerve root
Disc
CSF
Ilio-psoas
Fat
Para-spinous muscle

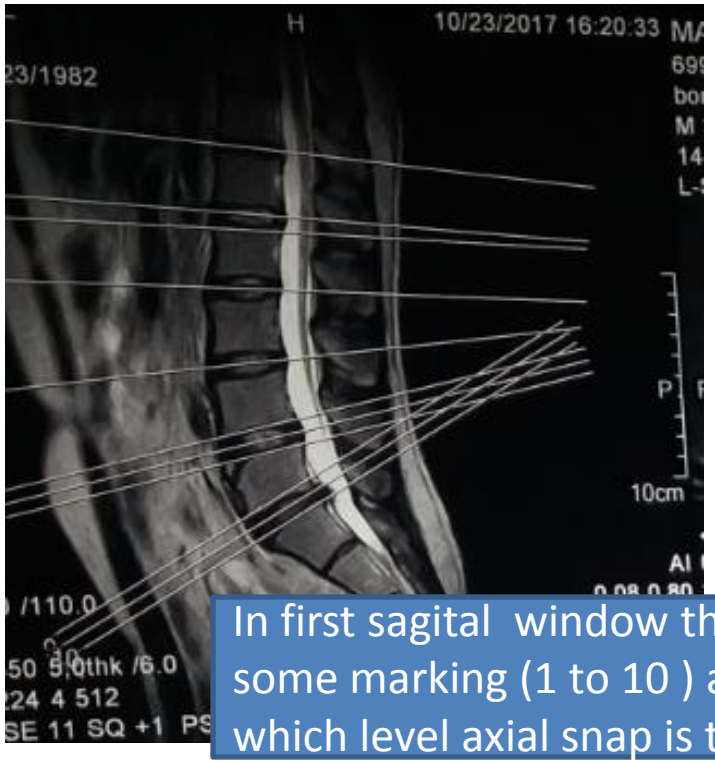

aorta
Nerve root
Ilio-psoas
Disc
CSF
Fat
Para-spinous muscle
Spine


Ilio-psoas
Disc
CSF
Nerve root
Para-spinous muscle

T 2 AXIAL FILM

Dr shamol

Axial film take some selected snap of At Disc level or vertebral level where pathology is suspected to see any root Compression present or not



In first sagital window there some marking (1 to 10) at which level axial snap is taken



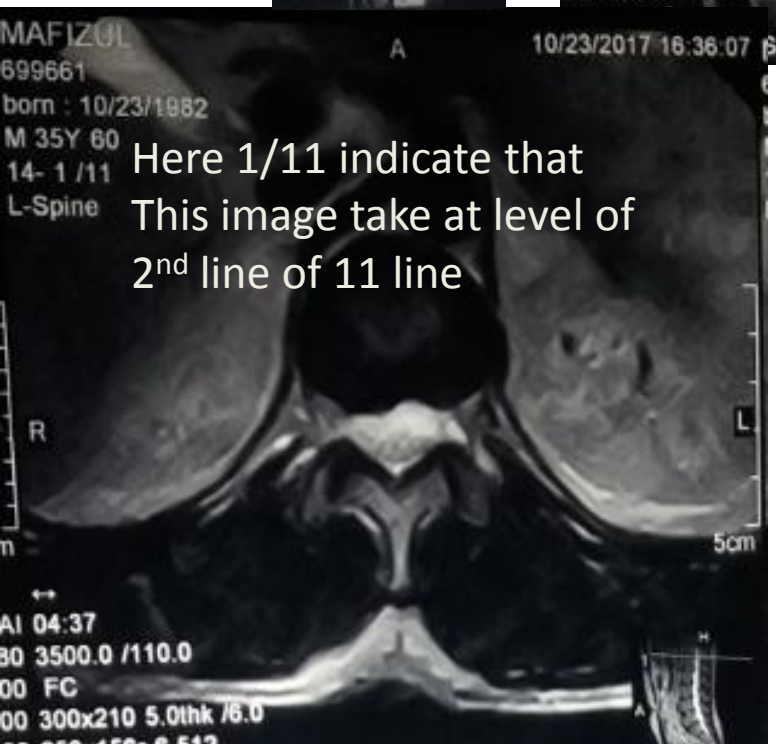
In each window of axial snap At bottom and right there is A small window of saggital Film with arrow / line mark Indication at which level section is taken

Here axial film has been at 11 level which is indicating by 11 line in first window

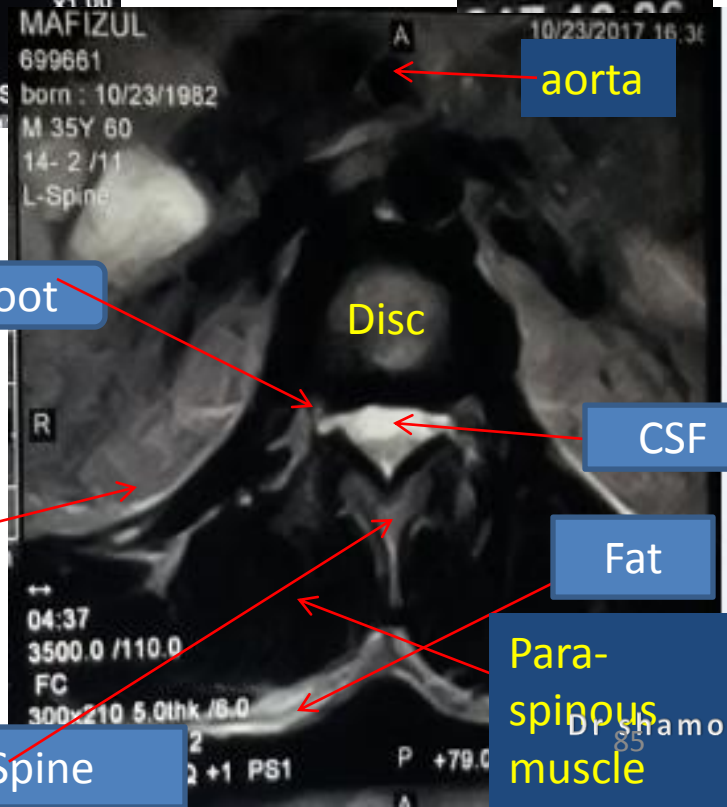








Here 1/11 indicate that This image take at level of 2nd line of 11 line



aorta

Nerve root

Disc

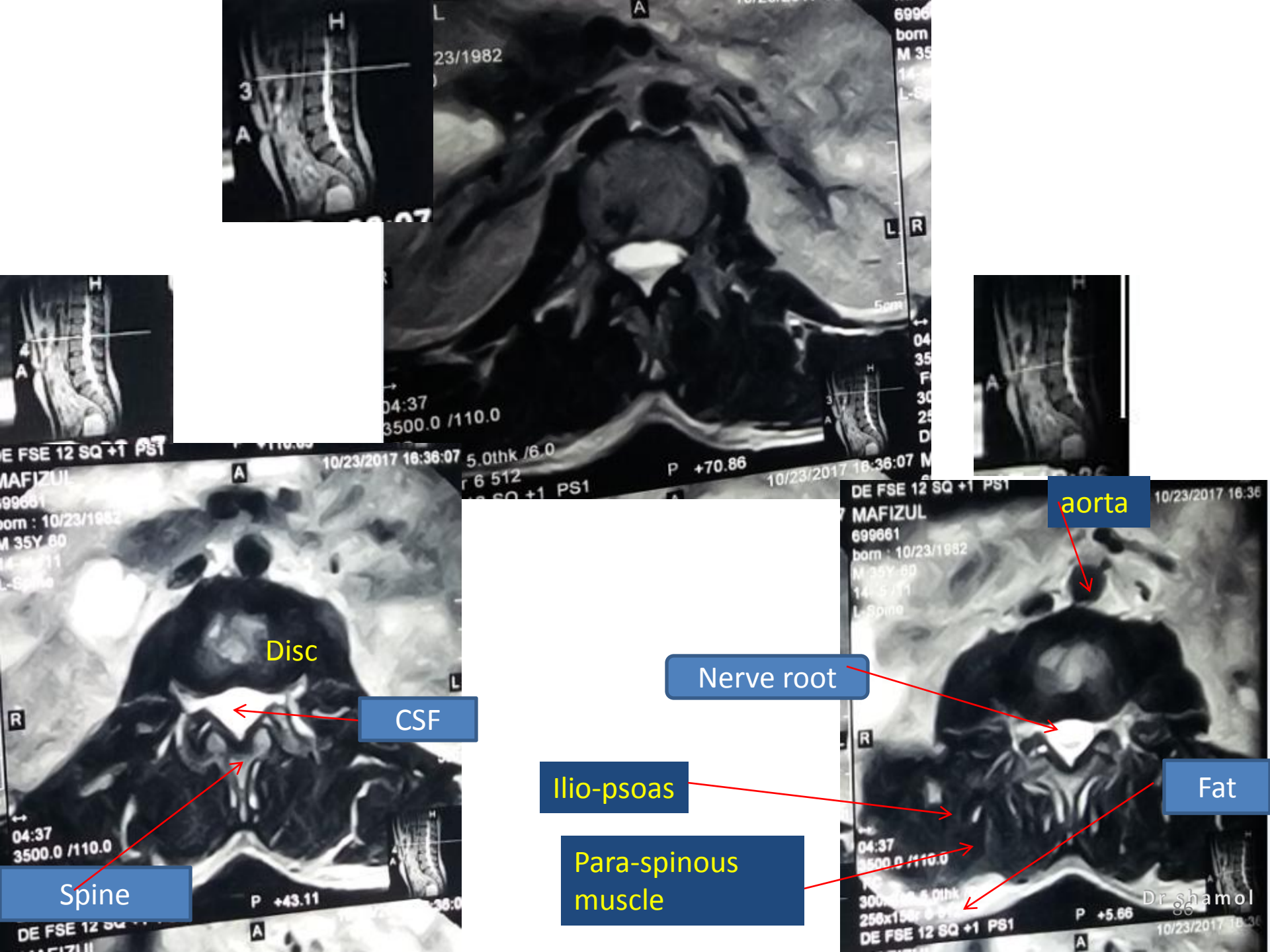
CSF

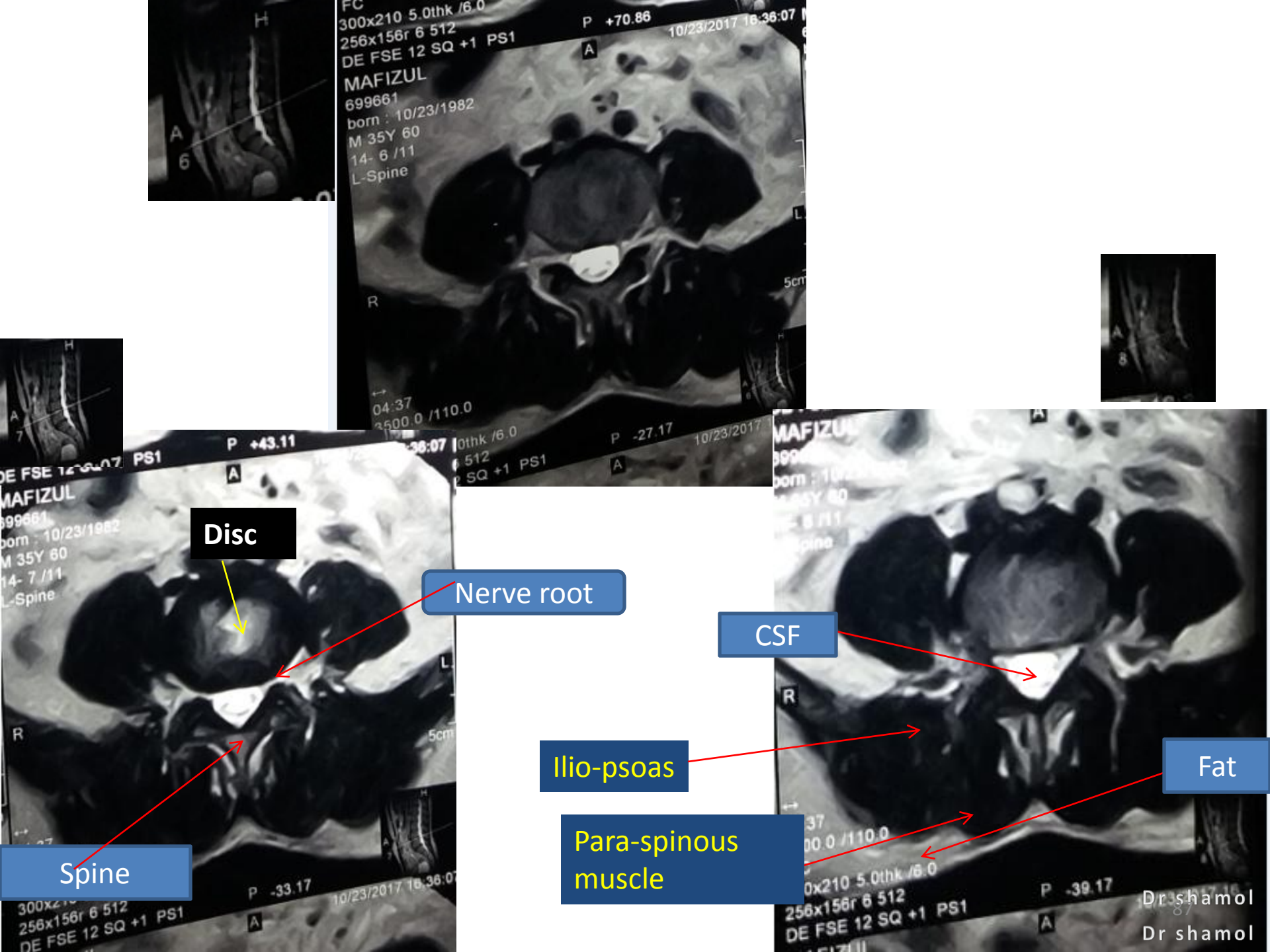
Ilio-psoas

Fat

Para-spinous muscle

Spine


aorta
Nerve root
Fat
Ilio-psoas
Para-spinous muscle
Disc
CSF
Spine


Disc
Nerve root
CSF
Ilio-psoas
Fat
Para-spinous muscle
Spine
MAFIZUL
699661
born : 10/23/1982
M 35Y 60
14- 7 /11
L-Spine
Dr shamol
Dr shamol

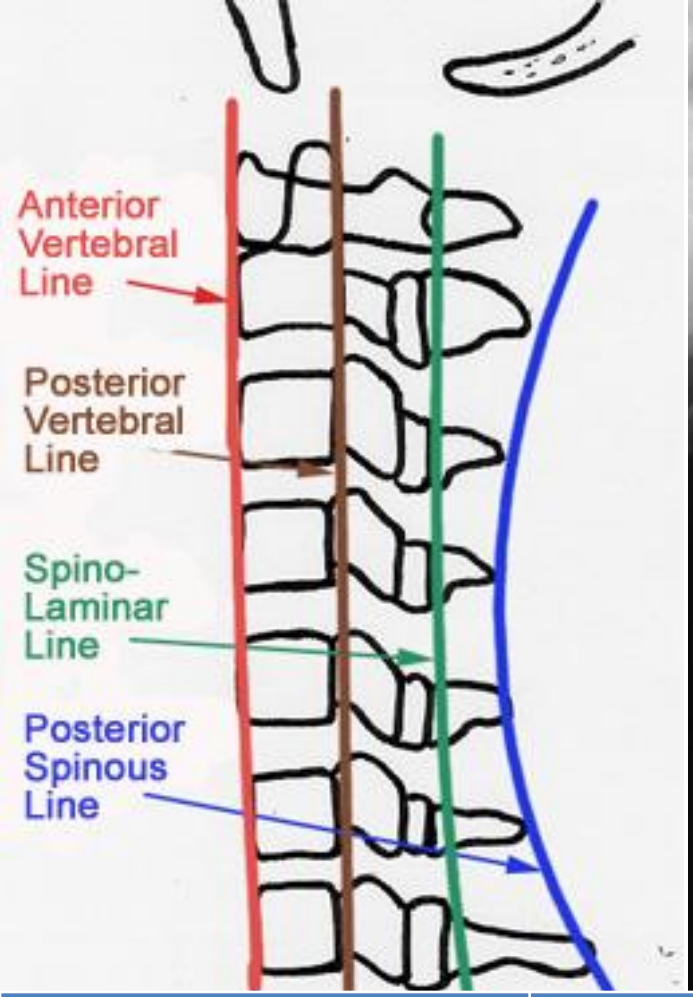
Section : 3
what will u see

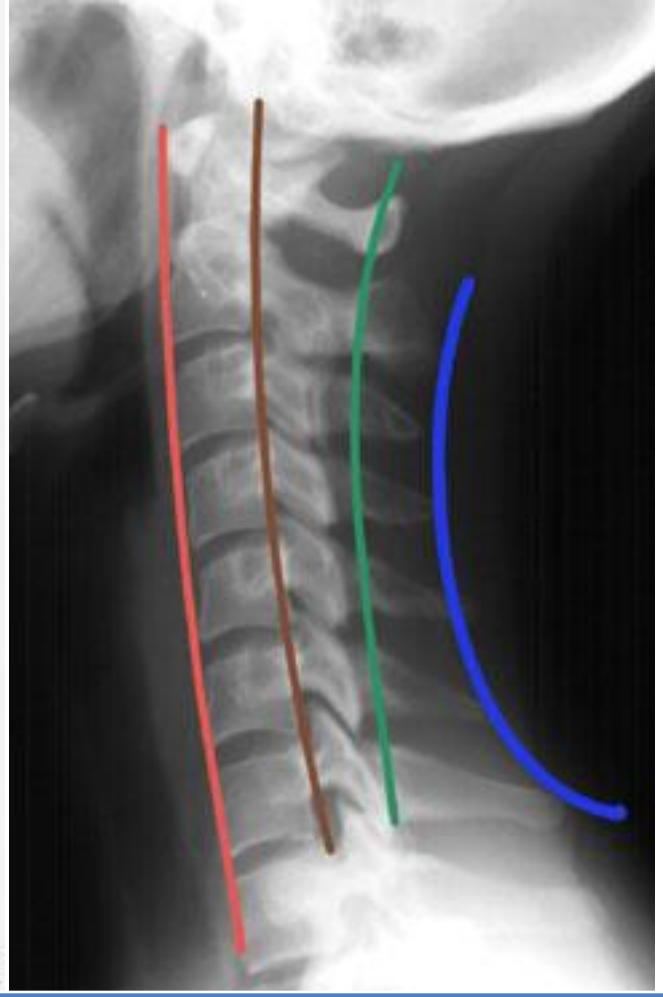
What to look in spine

Dr shamol

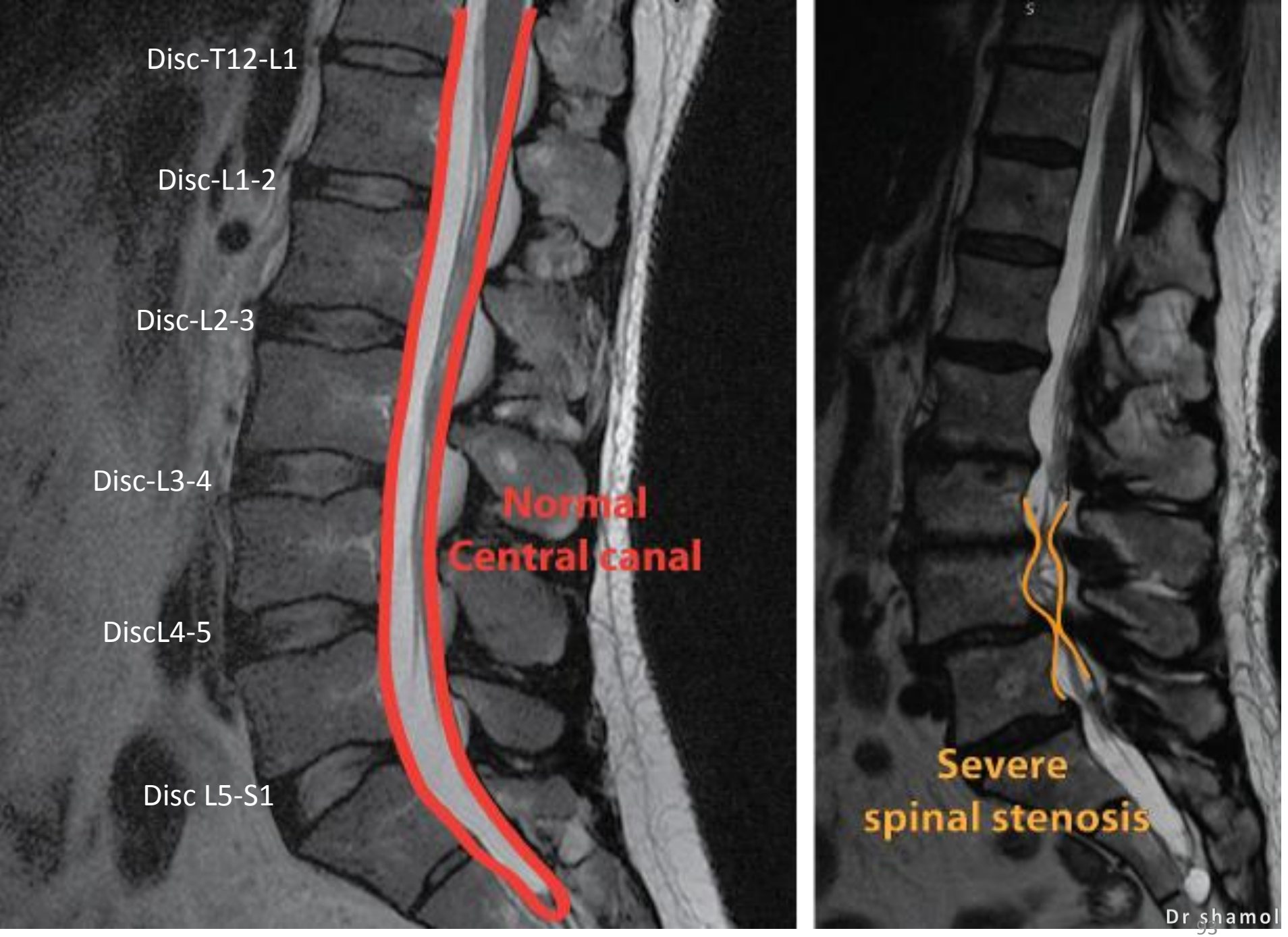
What will see in MRI of lumber spine	
A	Alignment
B	Bone
C	Cord/Canal
D	Discs
E	Everything else

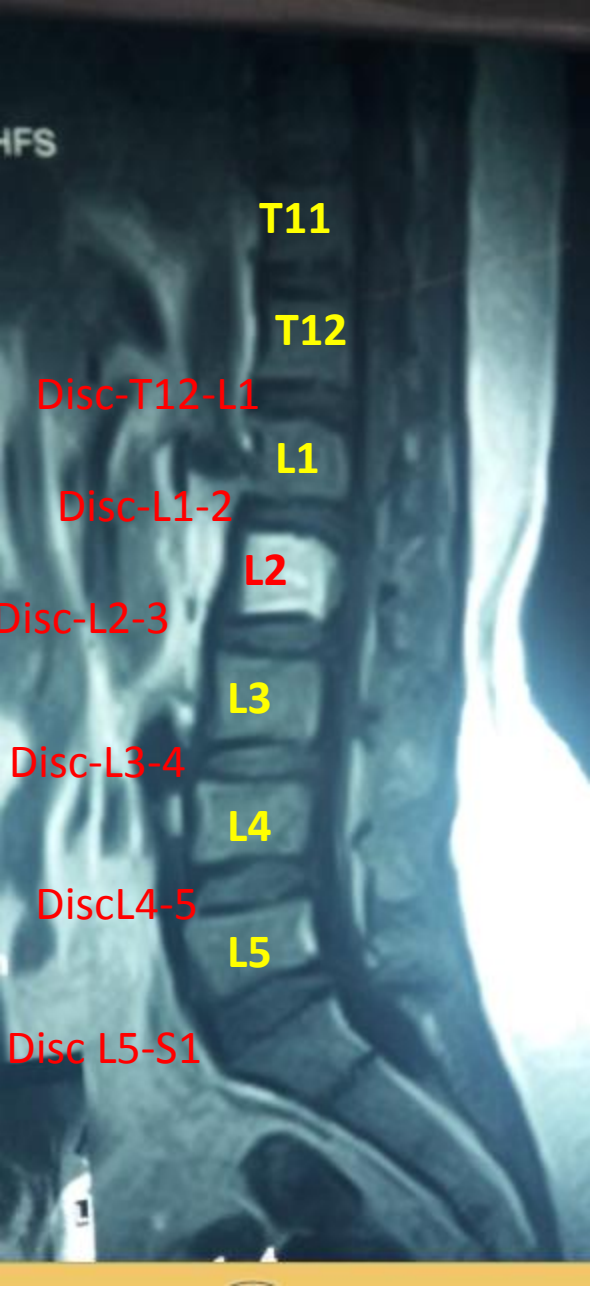
A	Alignment

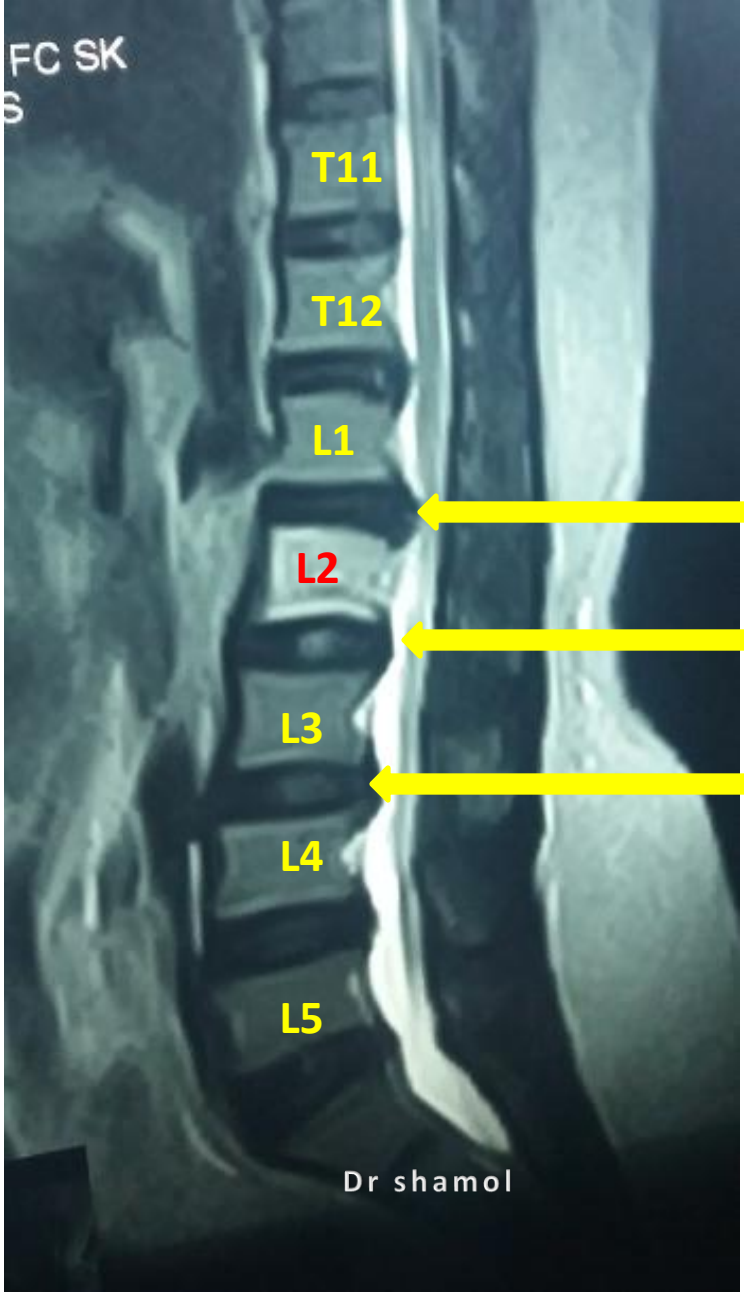




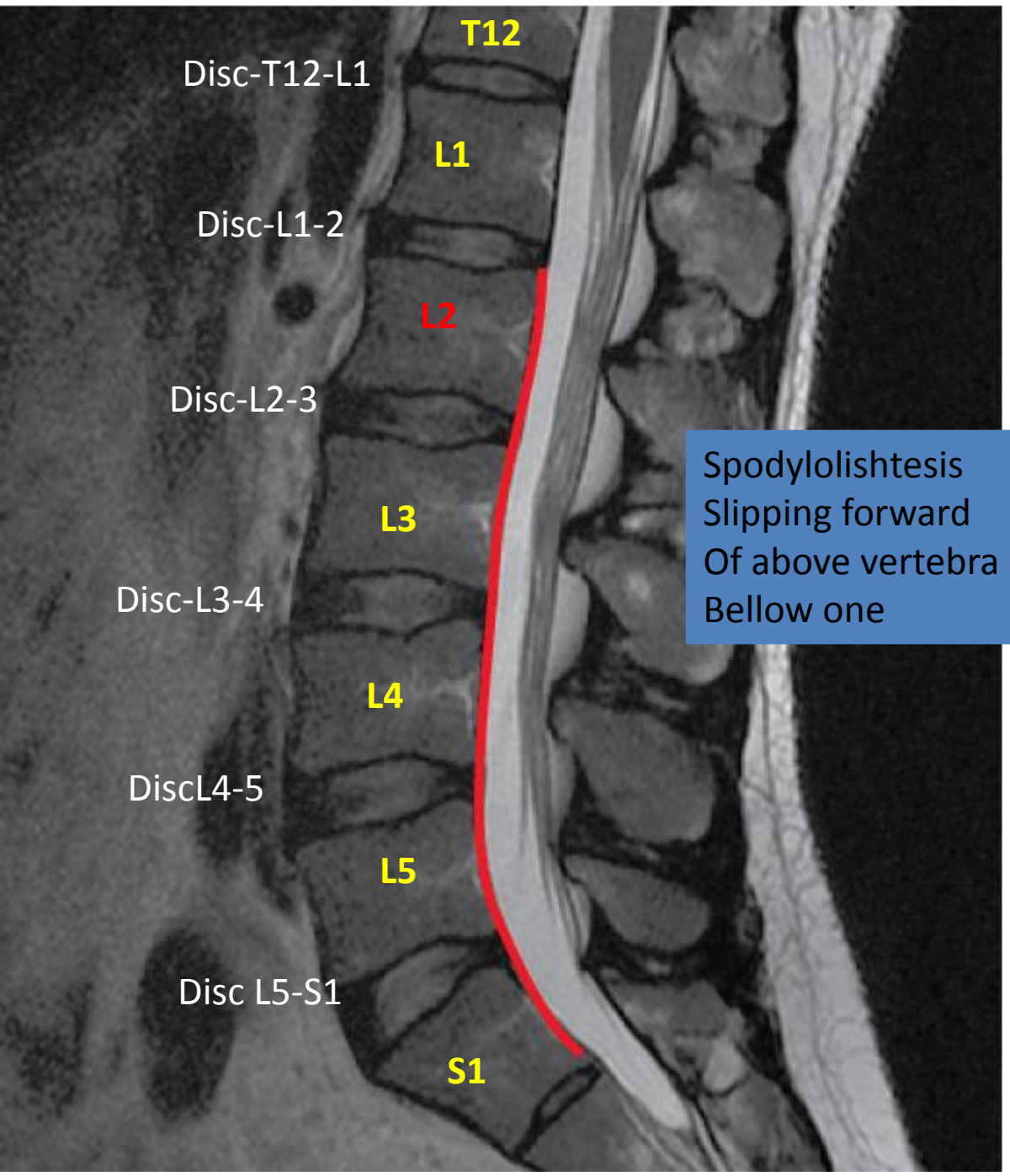
Alignment Assess four parallel lines. These are:	Anterior vertebral line (anterior margin of vertebral bodies)
	Posterior vertebral line (posterior margin of vertebral bodies)
	Spinolaminar line (posterior margin of spinal canal)
	Posterior spinous line (tips of the spinous processes)
	facets


Disc-T12-L1
Disc-L1-2
Disc-L2-3
Disc-L3-4
DiscL4-5
Disc L5-S1
Normal
Central canal
Severe
spinal stenosis
Dr shamol



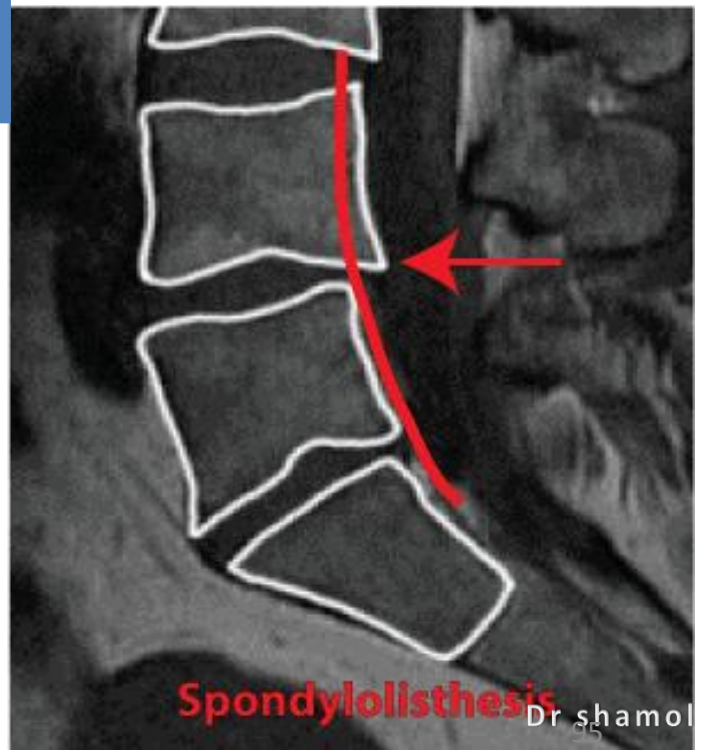


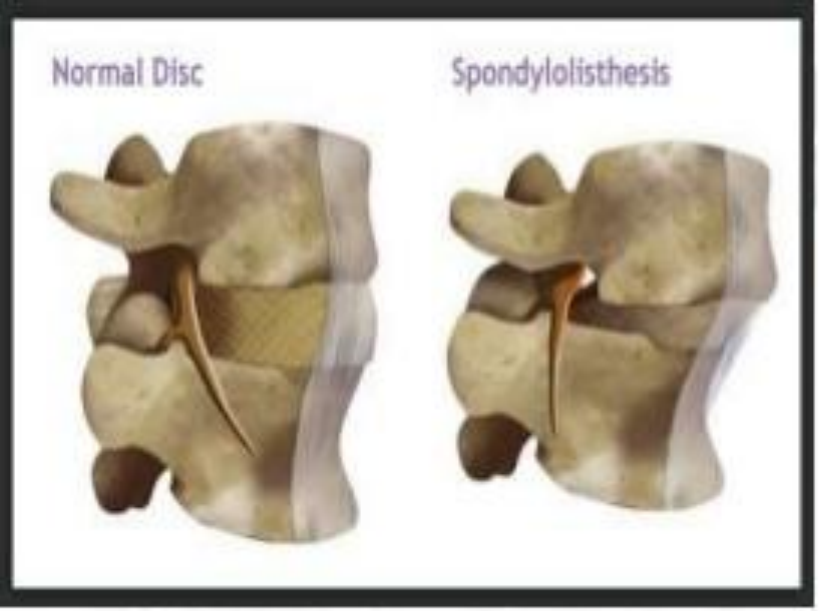
Posterior indentation Due to disc prolapsed

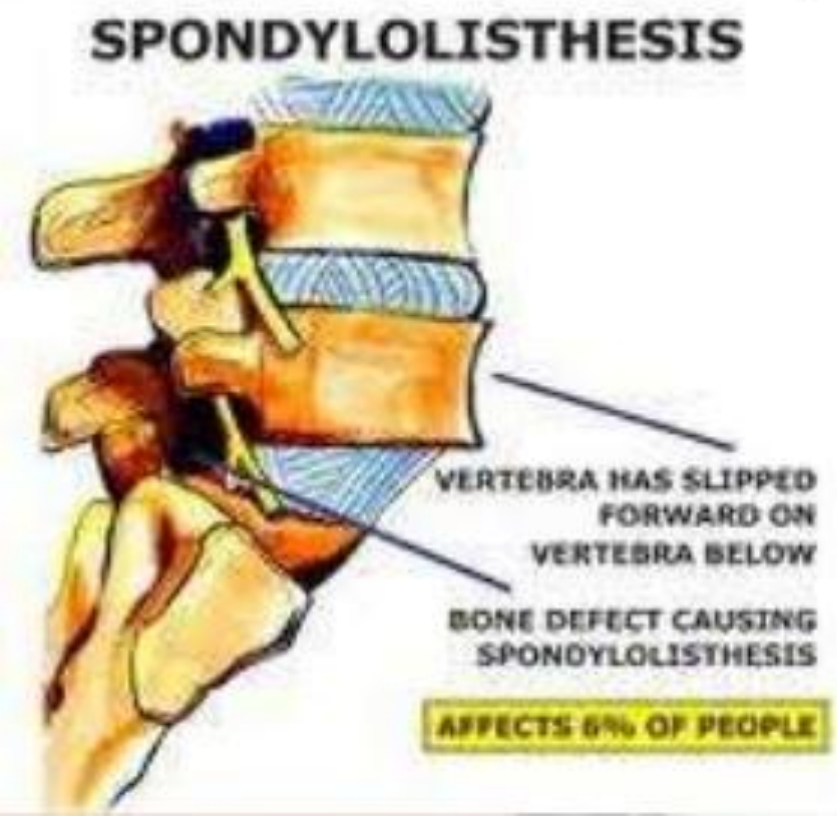


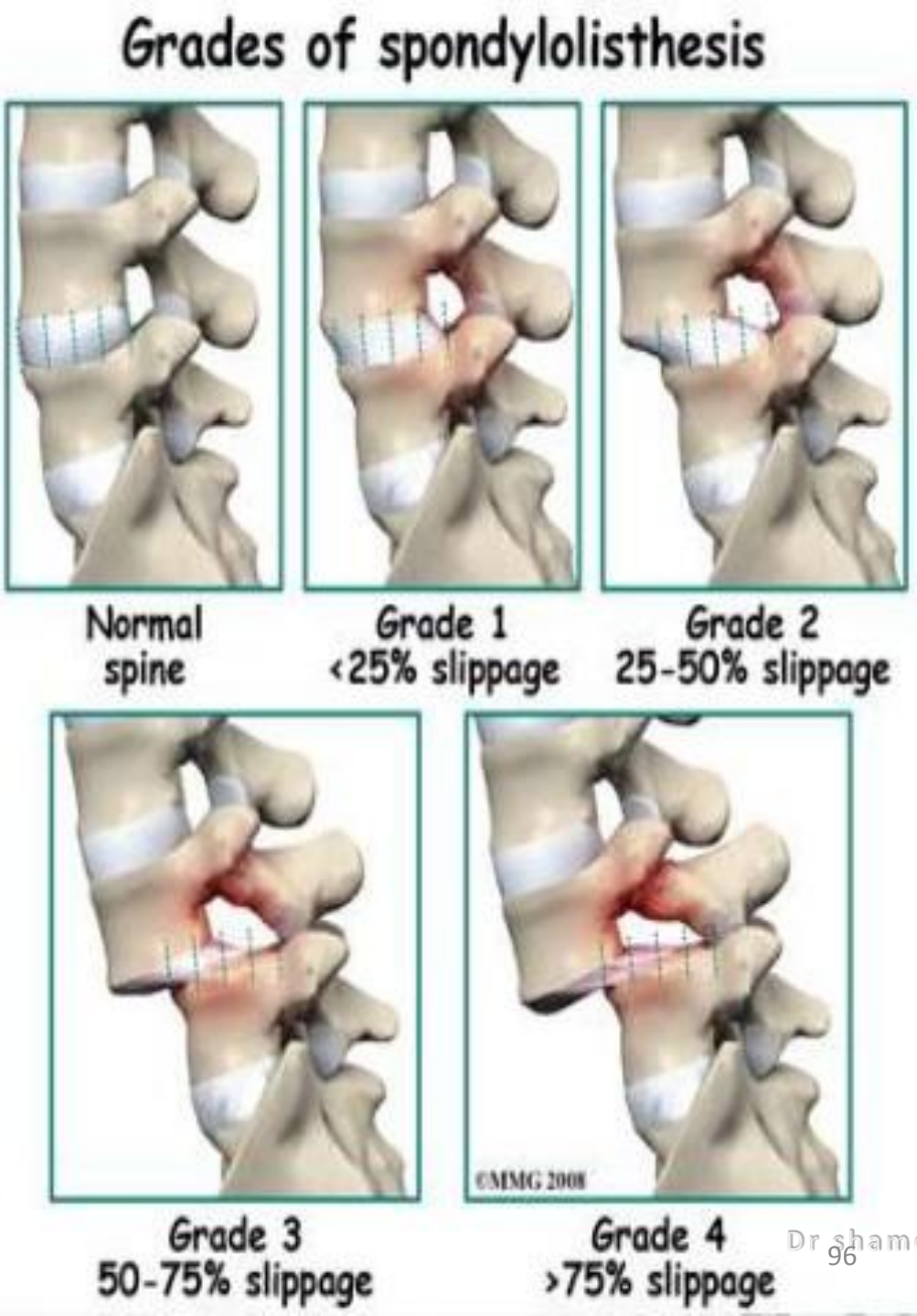
Spodylolishtesis
Slipping forward
Of above vertebra
Bellow one

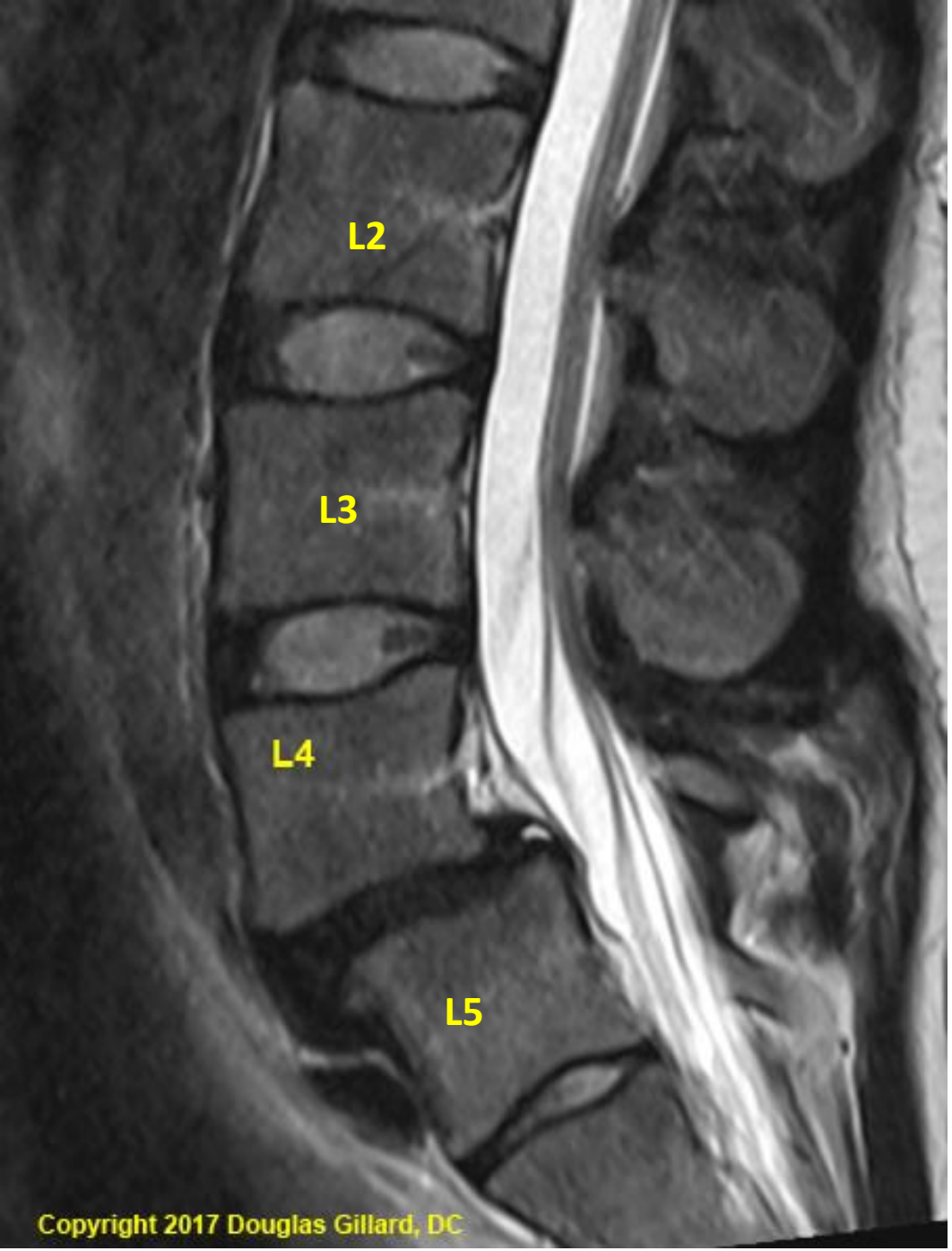


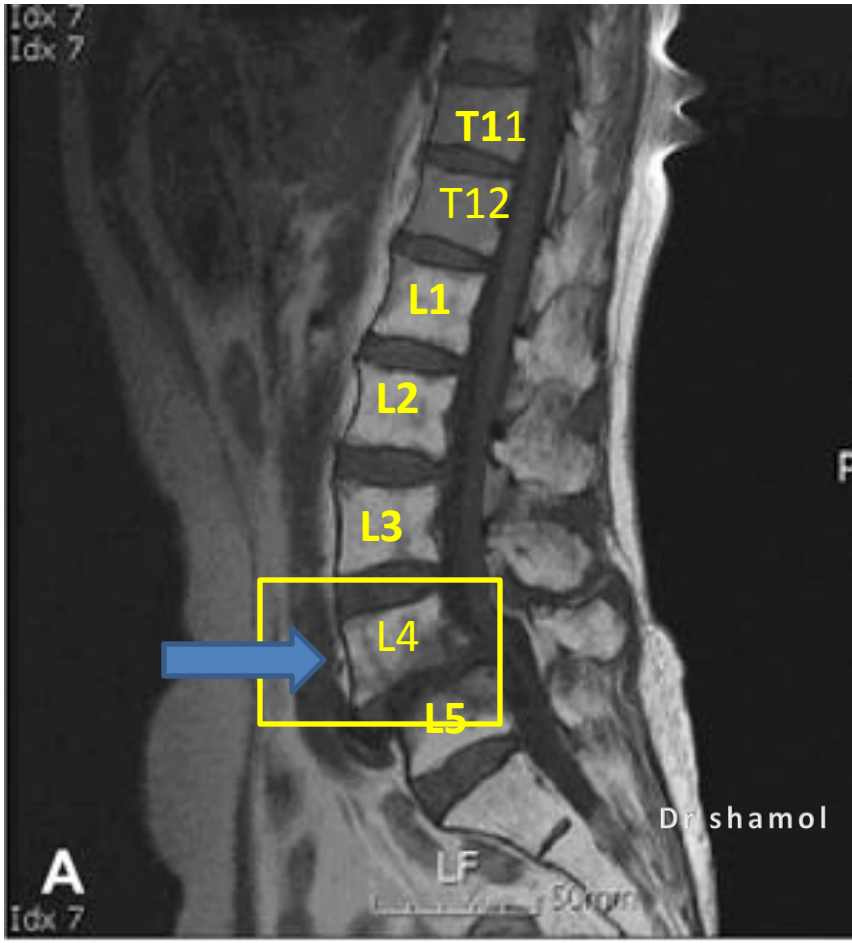



Normal Disc
Spondylolisthesis


SPONDYLOLISTHESIS
VERTEBRA HAS SLIPPED FORWARD ON VERTEBRA BELOW
BONE DEFECT CAUSING SPONDYLOLISTHESIS
AFFECTS 6% OF PEOPLE


Grades of spondylolisthesis
Normal spine
Grade 1 <25% slippage
Grade 2 25-50% slippage
Grade 3 50-75% slippage
Grade 4 >75% slippage
©MMG 2008

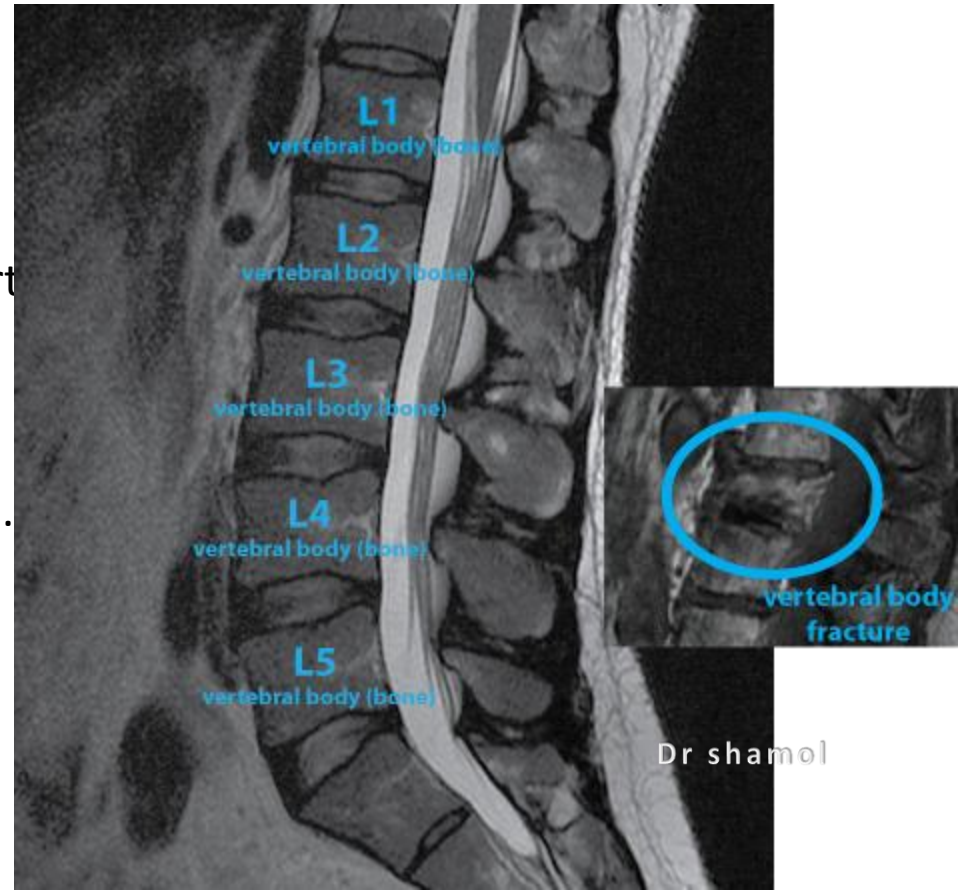

L2
L3
L4
L5
Copyright 2017 Douglas Gillard, DC

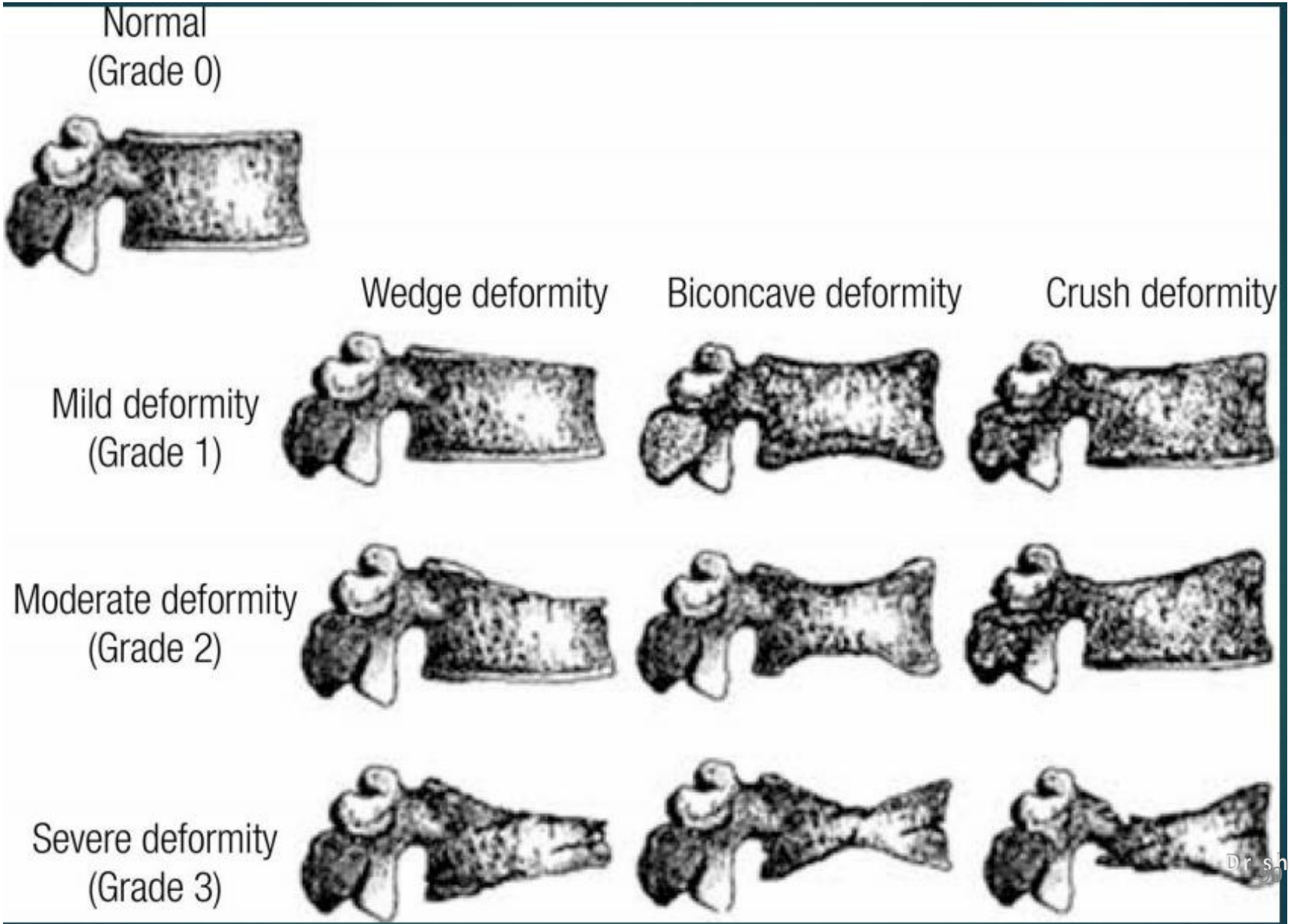

T11
T12
L1
L2
L3
L4
L5
A
LF
Dr shamol

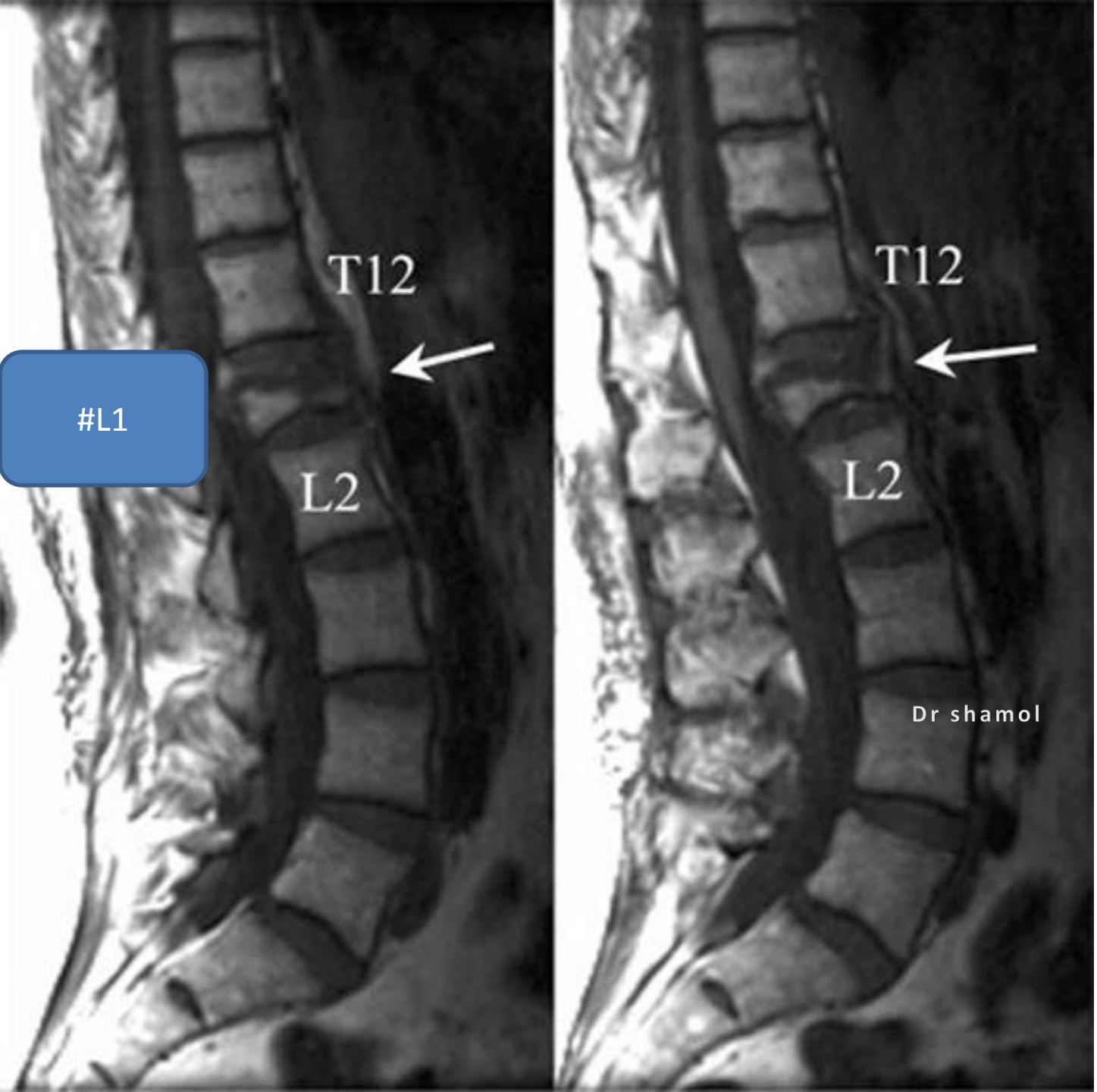
Dr shamol

B Bone / Bone Marrow	Fractures	Vertebral body compression	
		Grading	mild: 20-25%
			moderate: 25-40%
			severe: >40%
	Blastic / lytic lesions		

5 vertebral bodies that stack up and form the lumbar spine or the spine within the lower back. They are numbered top down from one to five. Their function is to support and protect the delicate nerves that pass through to the pelvis and lower legs. They should have a general square shape. If they look triangular, it indicates a fracture (inset).




Normal
(Grade 0)
Wedge deformity
Biconcave deformity
Crush deformity
Mild deformity
(Grade 1)
Moderate deformity
(Grade 2)
Severe deformity
(Grade 3)



#L1

MRI

MRI is sensitive to metastatic disease and is able also to assess for cord compression. The signal intensity of the metastatic deposits will vary according to the degree of mineralisation.

Osteoblastic metastases

T1: hypointense

T2: hypointense

Mixed sclerotic and lytic extradural bone lesions

T1: hypointense

T2: hypo- and/or hyperintense

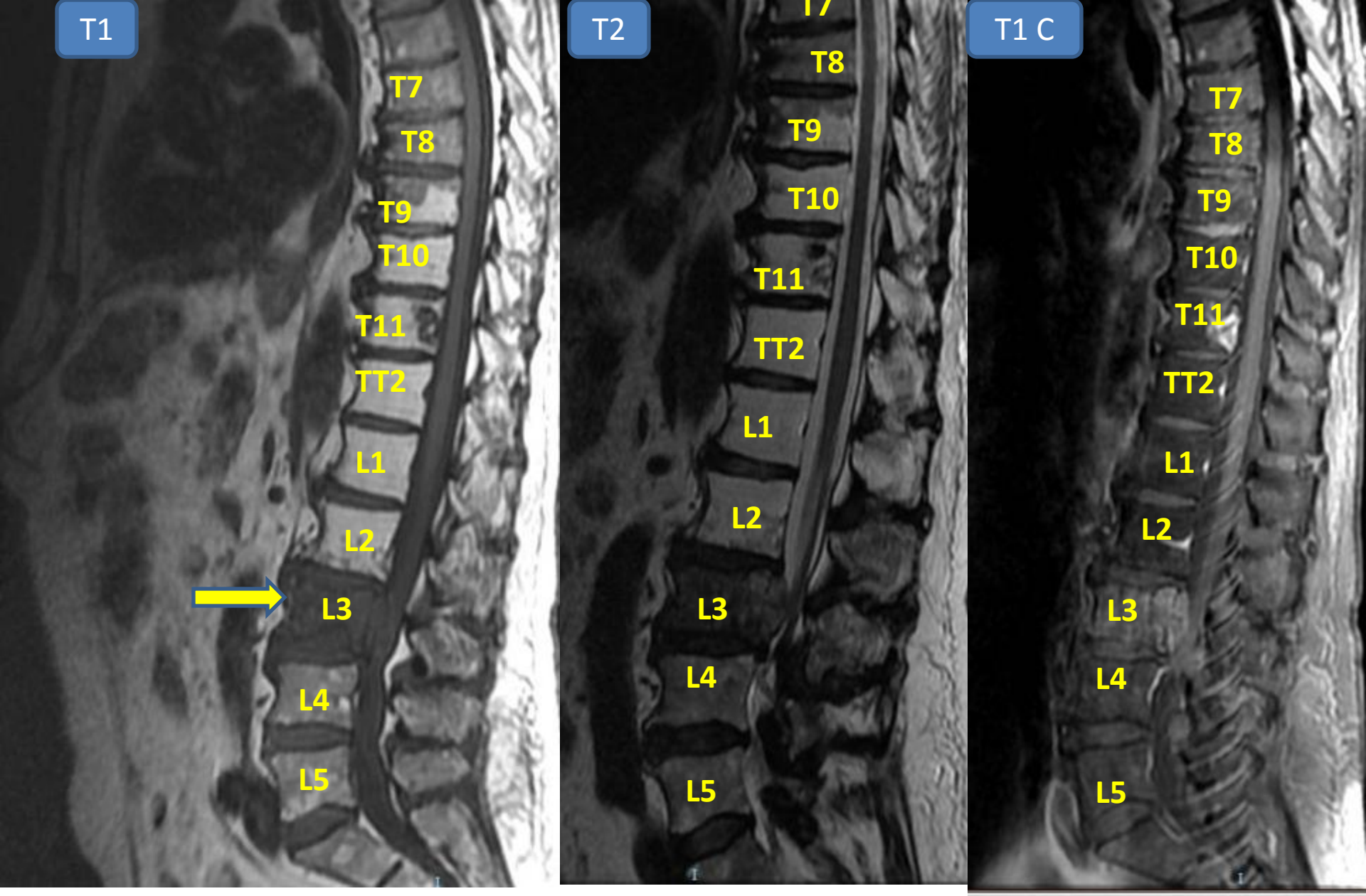
Lytic extradural bone lesions

T1: intermediate to hypointense

T2: hyper- or isointense

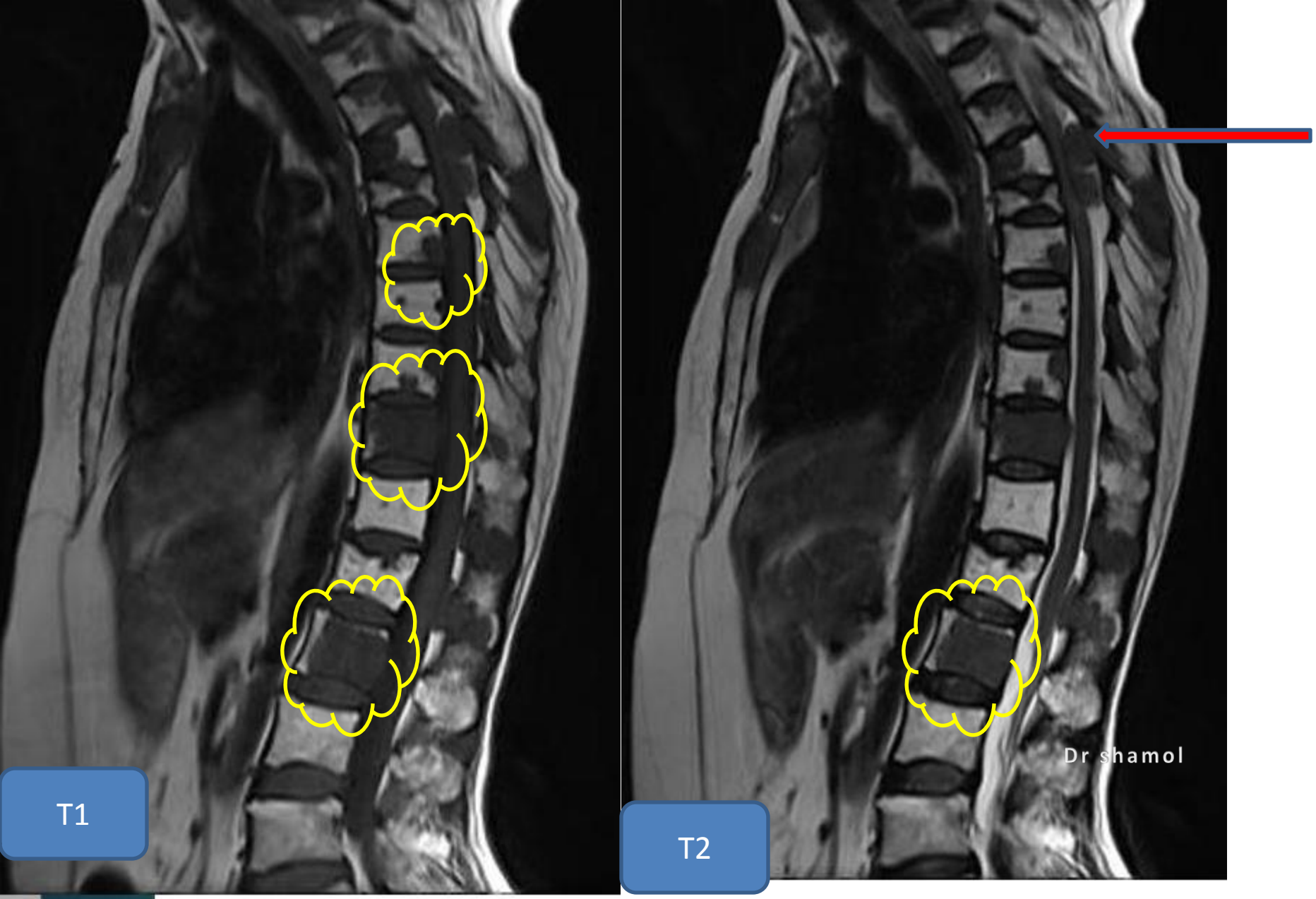
T1 C+ (Gd): enhancement usually present

Dr shamol

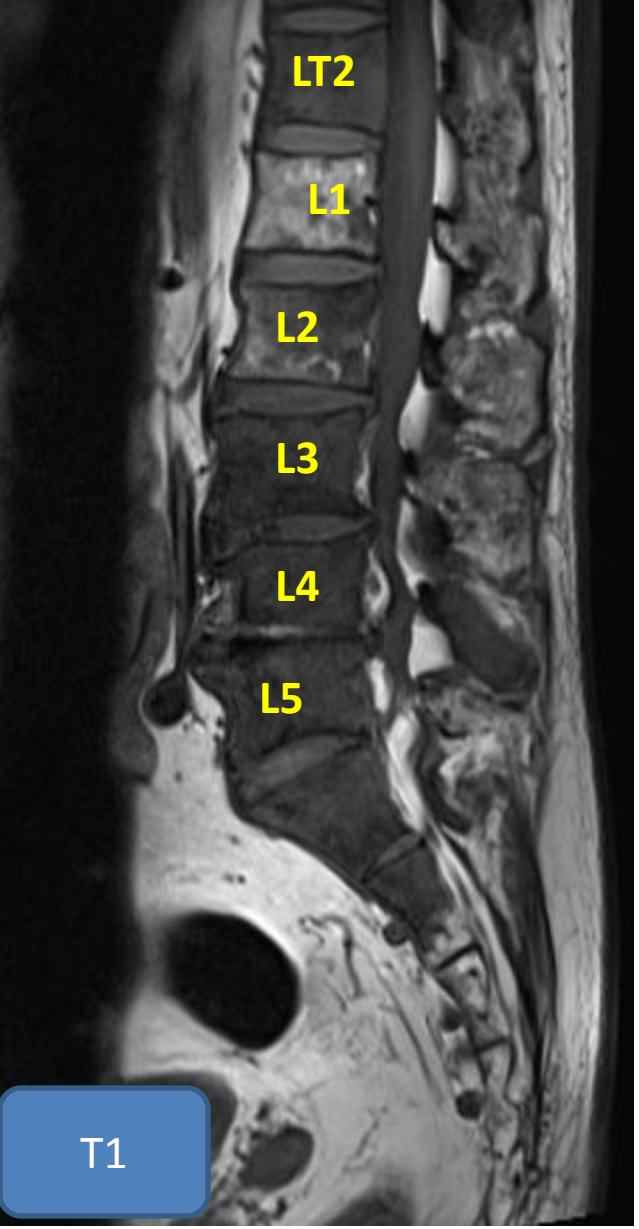


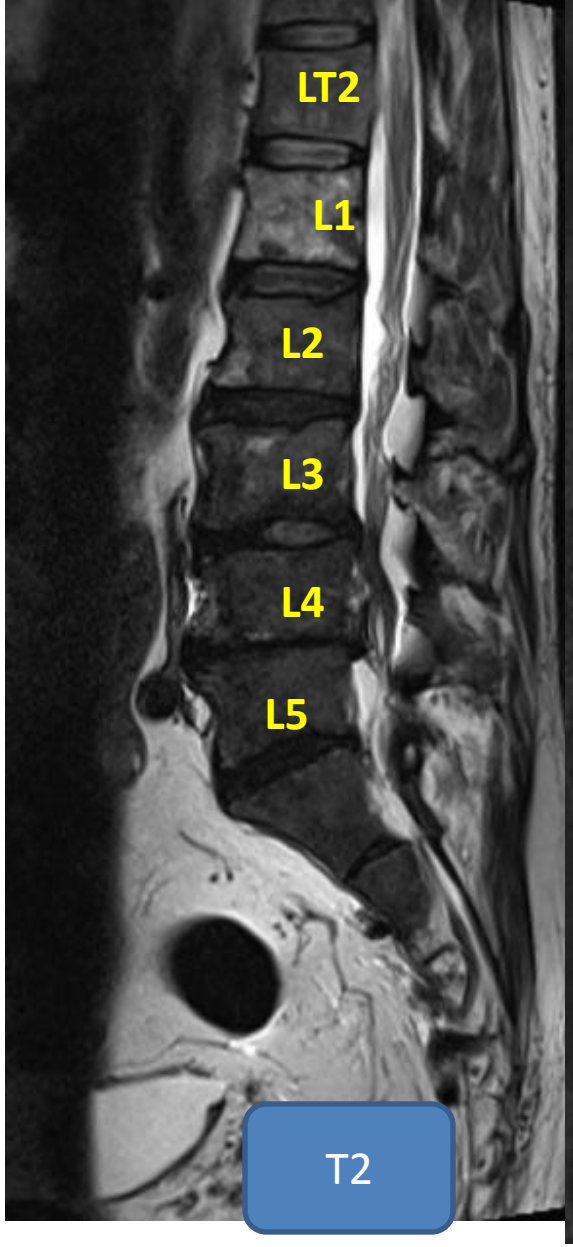
L3 vertebral body pathological fracture and extraosseous epidural enhancing tumor, which compresses the thecal sac.Old (quiescent) T11 metastasis.
Lower thoracic and upper lumbar post-radiotherapy fatty marrow changes.

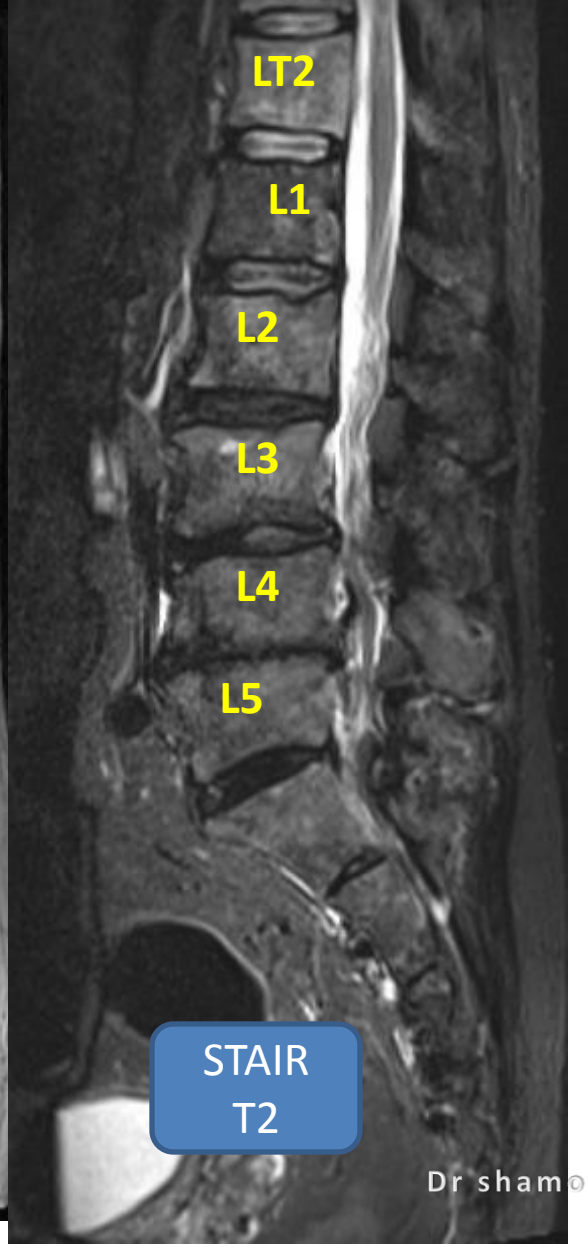
Dr shamol



multiple altered signals and wedging in the dorso lumbar vertebral bodies and posterior elements .posterior epidural soft tissue at D5 and D6 levels, compressing the spinal cord

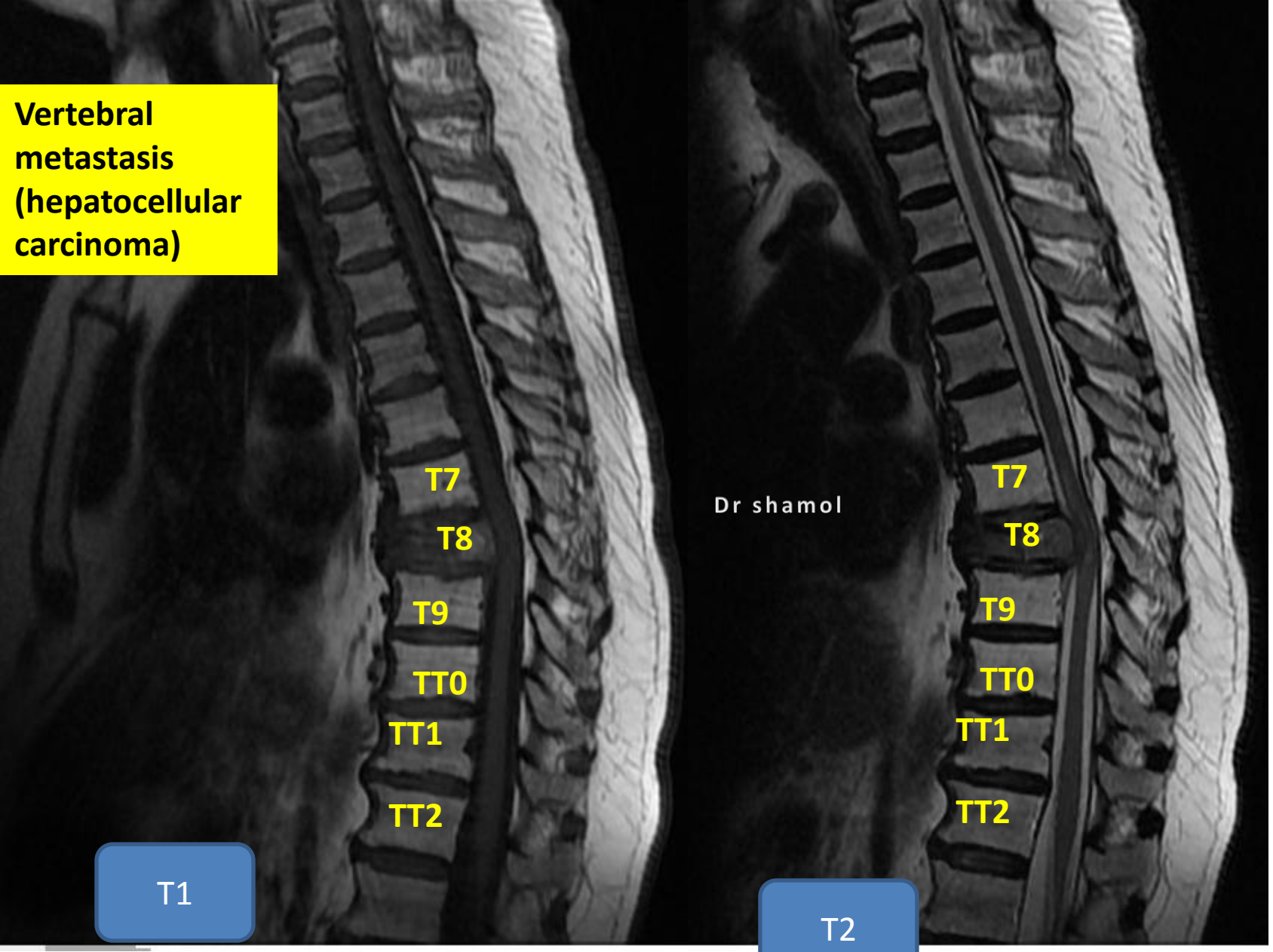






Prostatic bony metastases

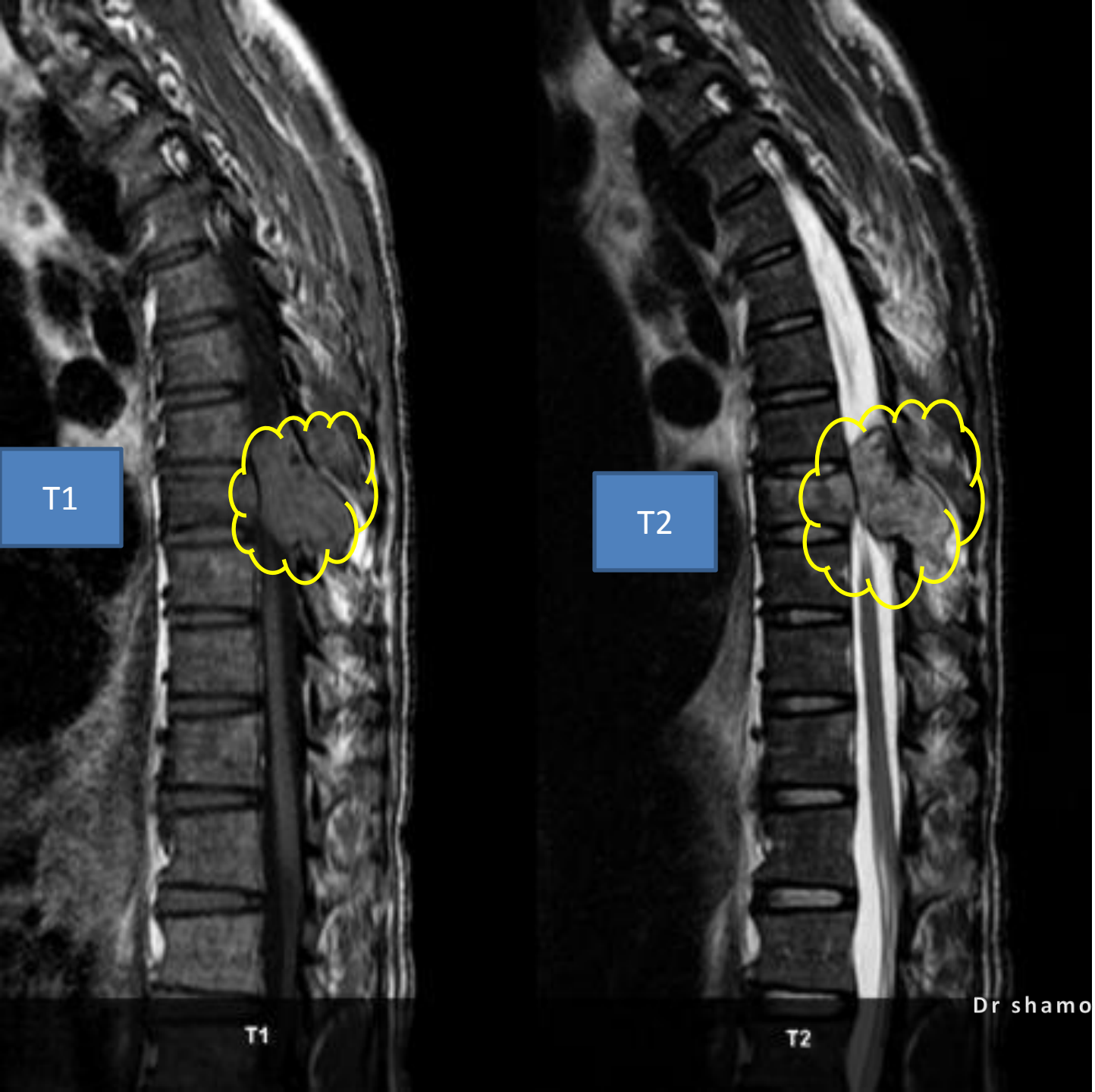
canal stenosis at L4/L5.



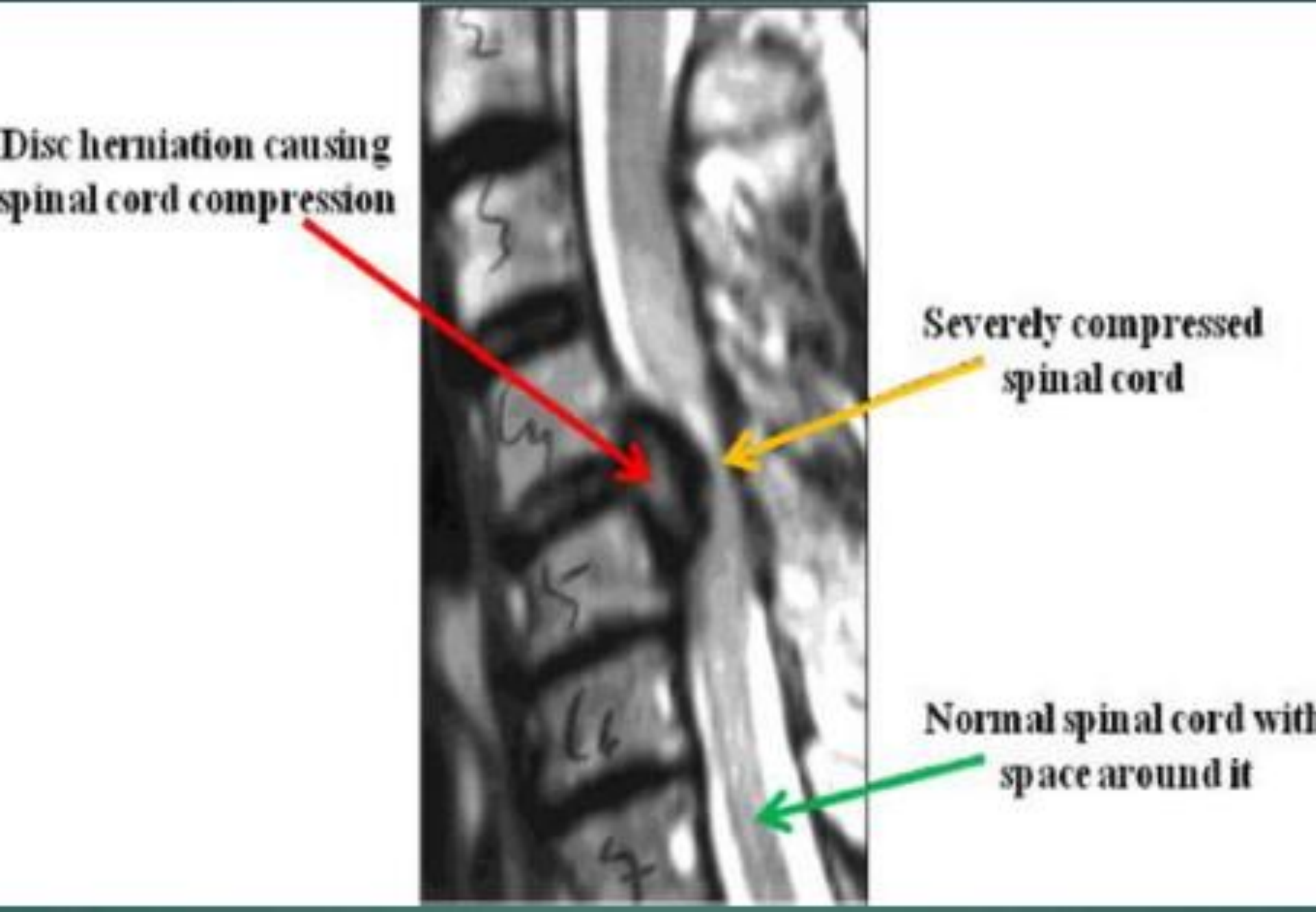
Collapse of D8 vertebral body with convex posterior verterbal margin retropulsed and impinging on ventral thecal sac, compressing dorsal cord.. T1 hypointense, T2 and heterogeneously hyperintense

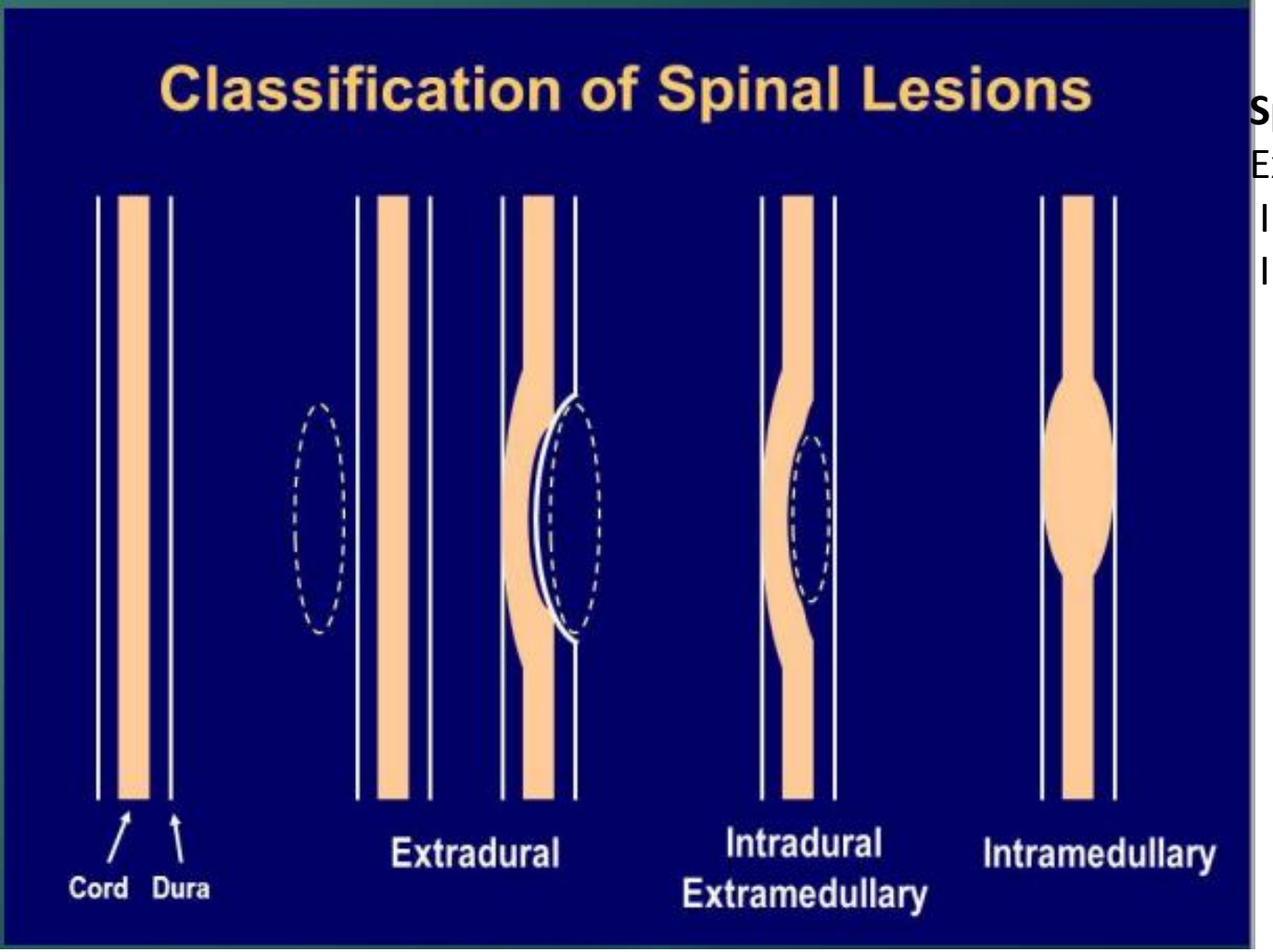


Dr shamol


T1
T2
T1
T2
Dr shamo

Cord/ Canal	Cord normally terminates at L1 -2
	Cord compression
	Signal change
	Tumors


Disc herniation causing spinal cord compression
Severely compressed spinal cord
Normal spinal cord with space around it



Spinal Cord/Canal Tumors

Extradural

Intradural / Extramedullary

IntraMedullary

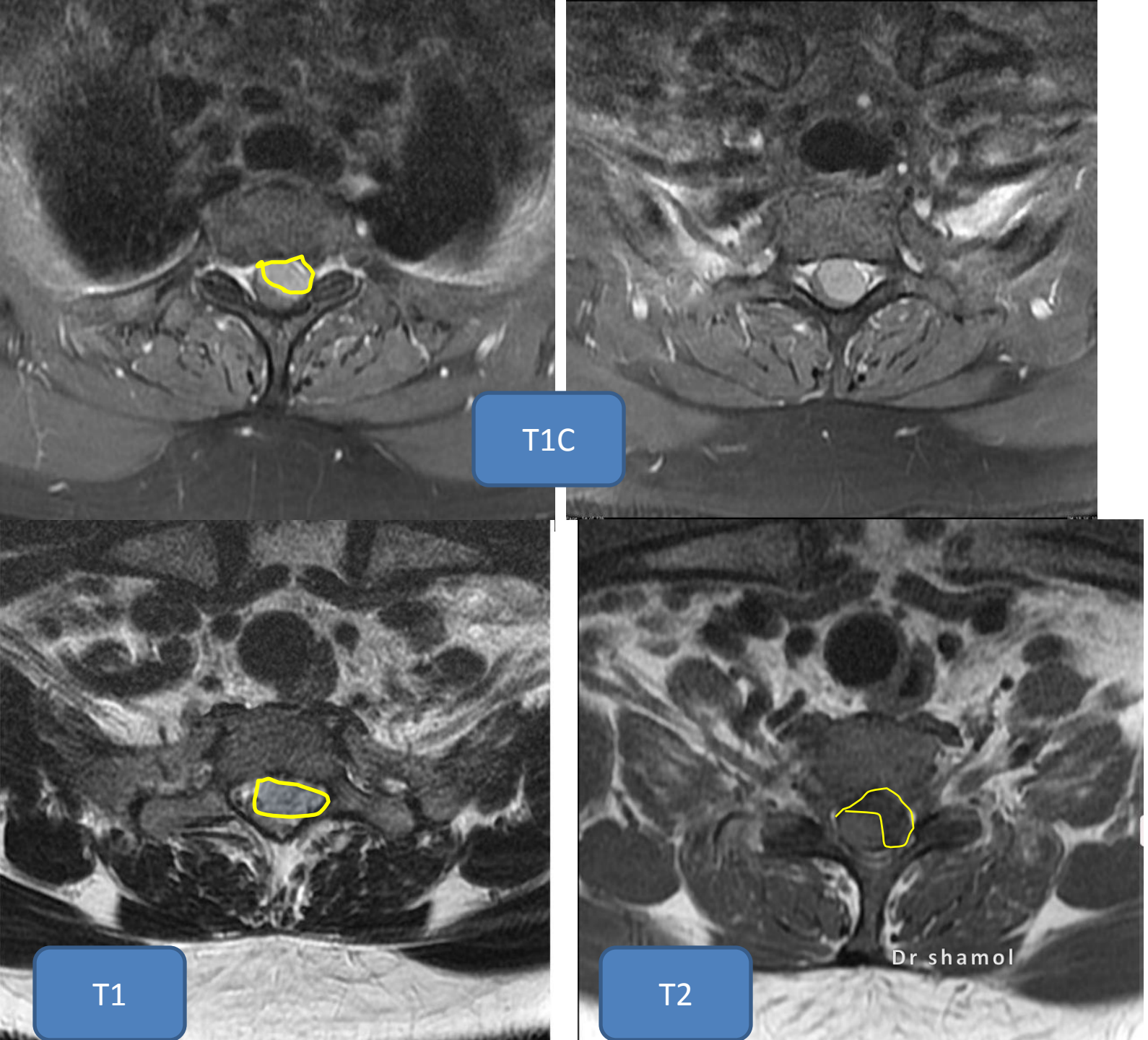


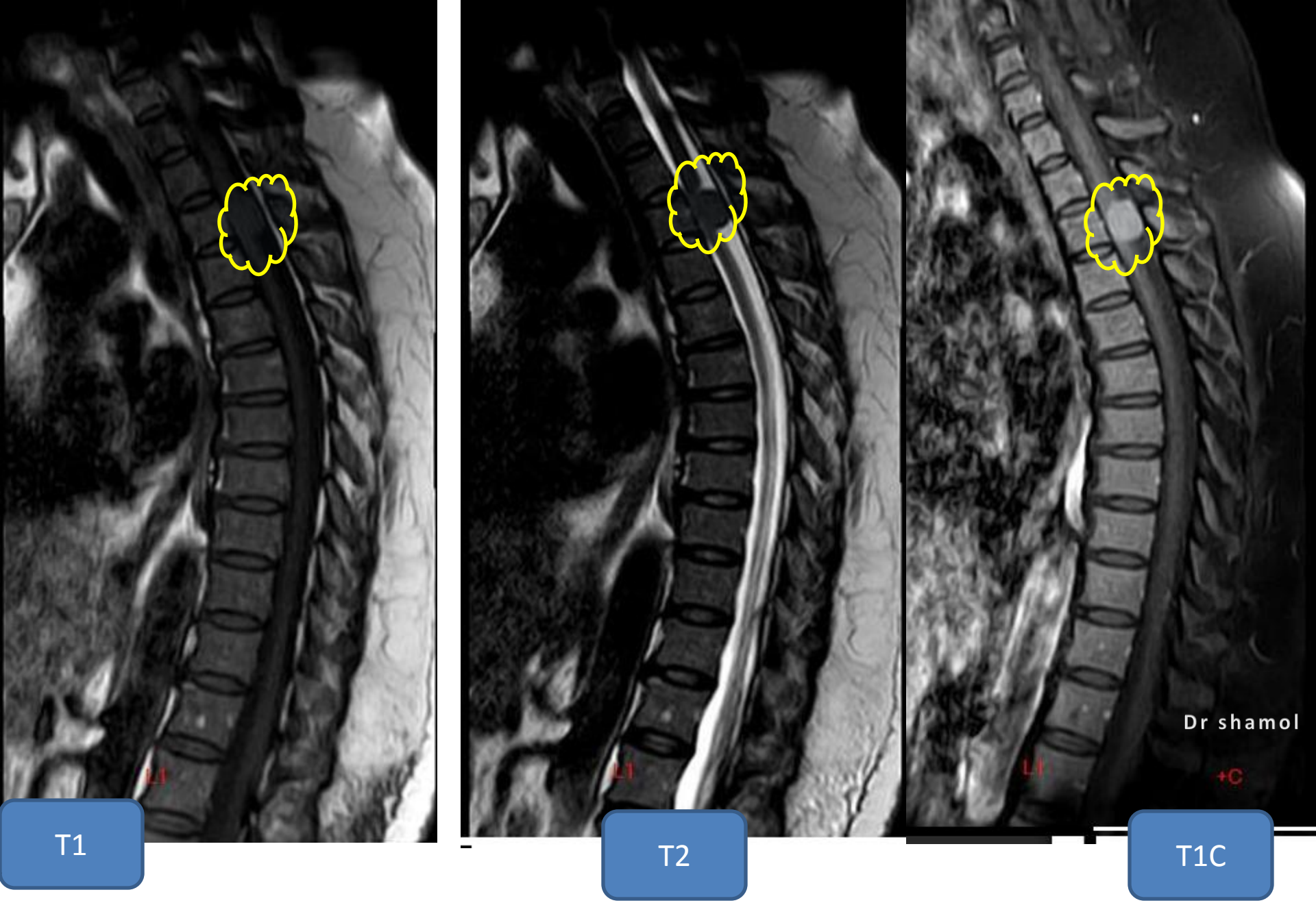
T1

T2

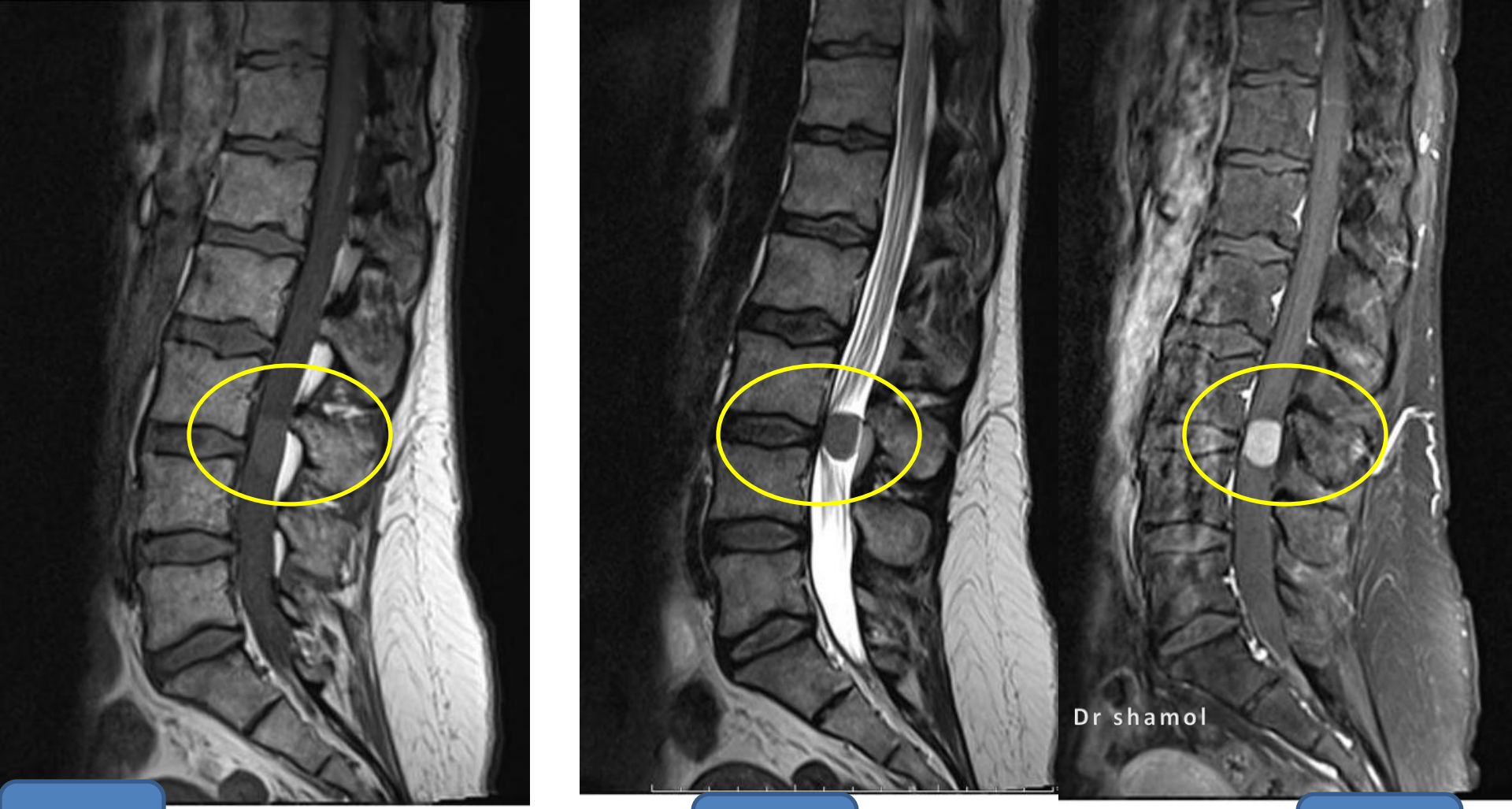
T1C

Spinal meningioma


T1C
T1
T2
Dr shamol



meningioma

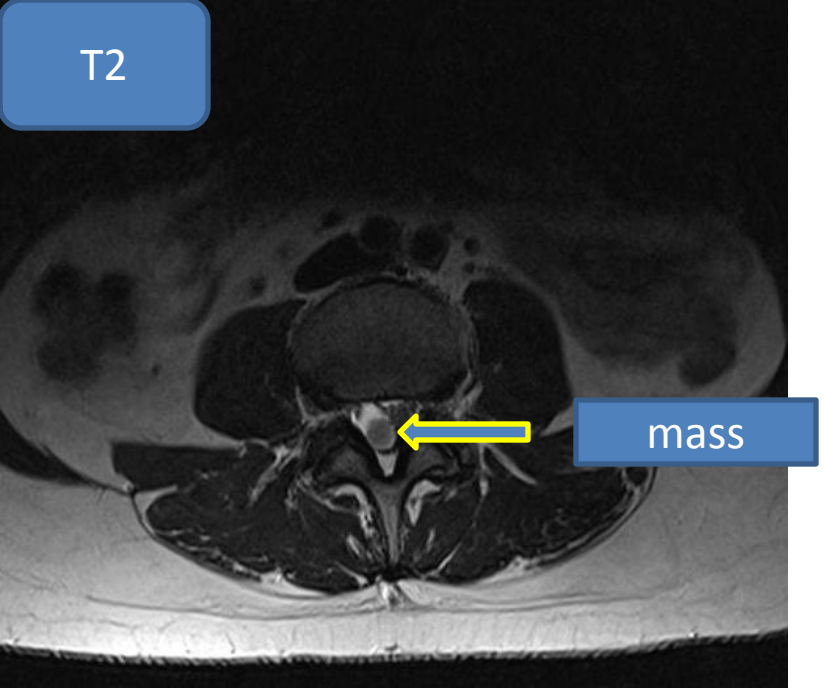


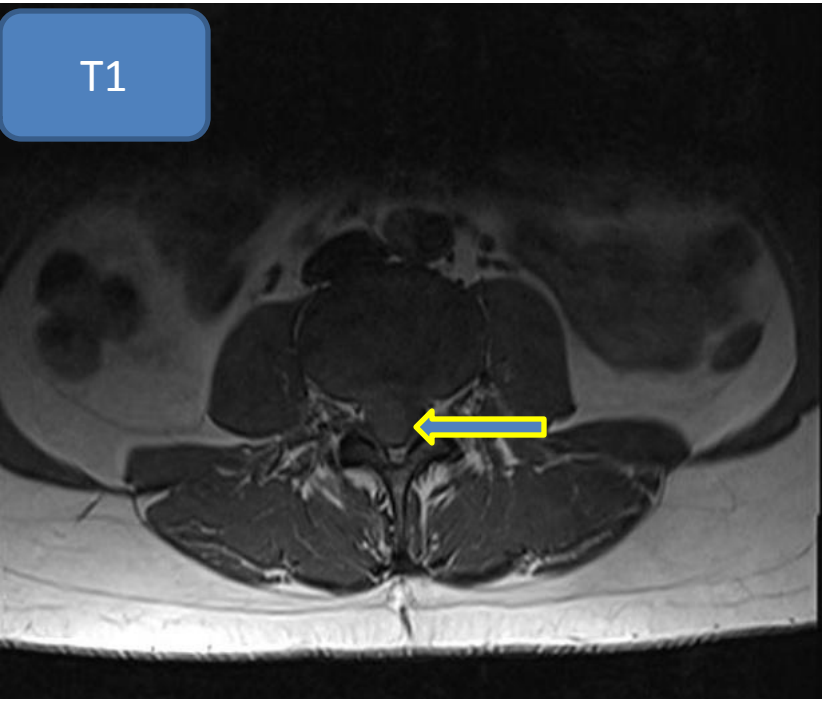
T1

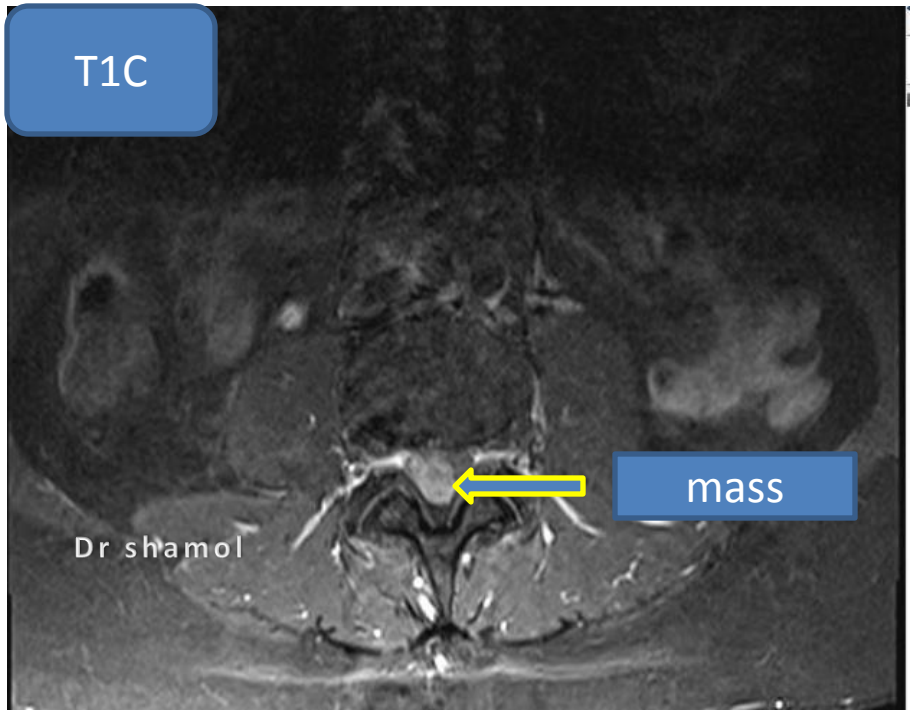
T2

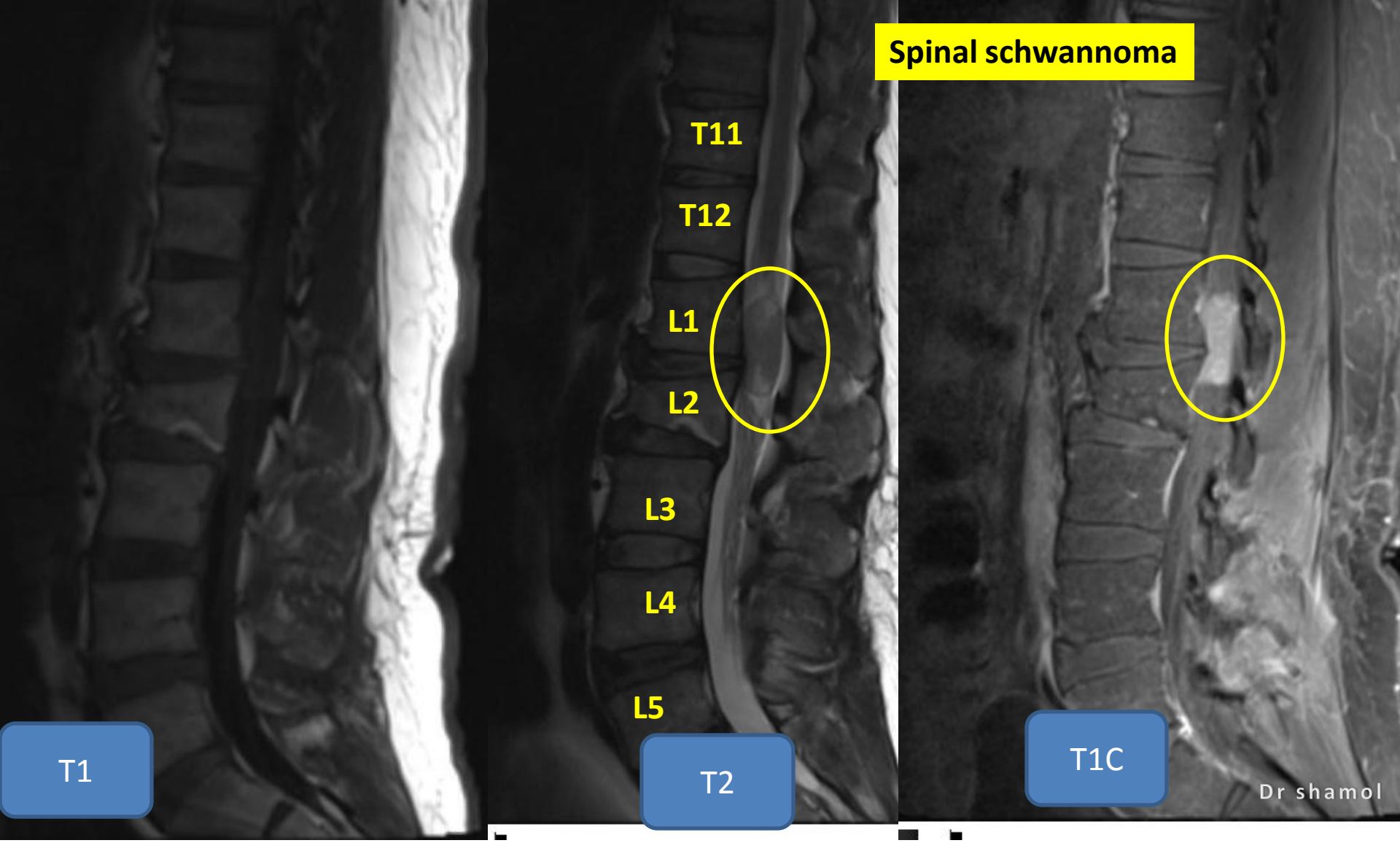
T1C

meningioma


T2
mass

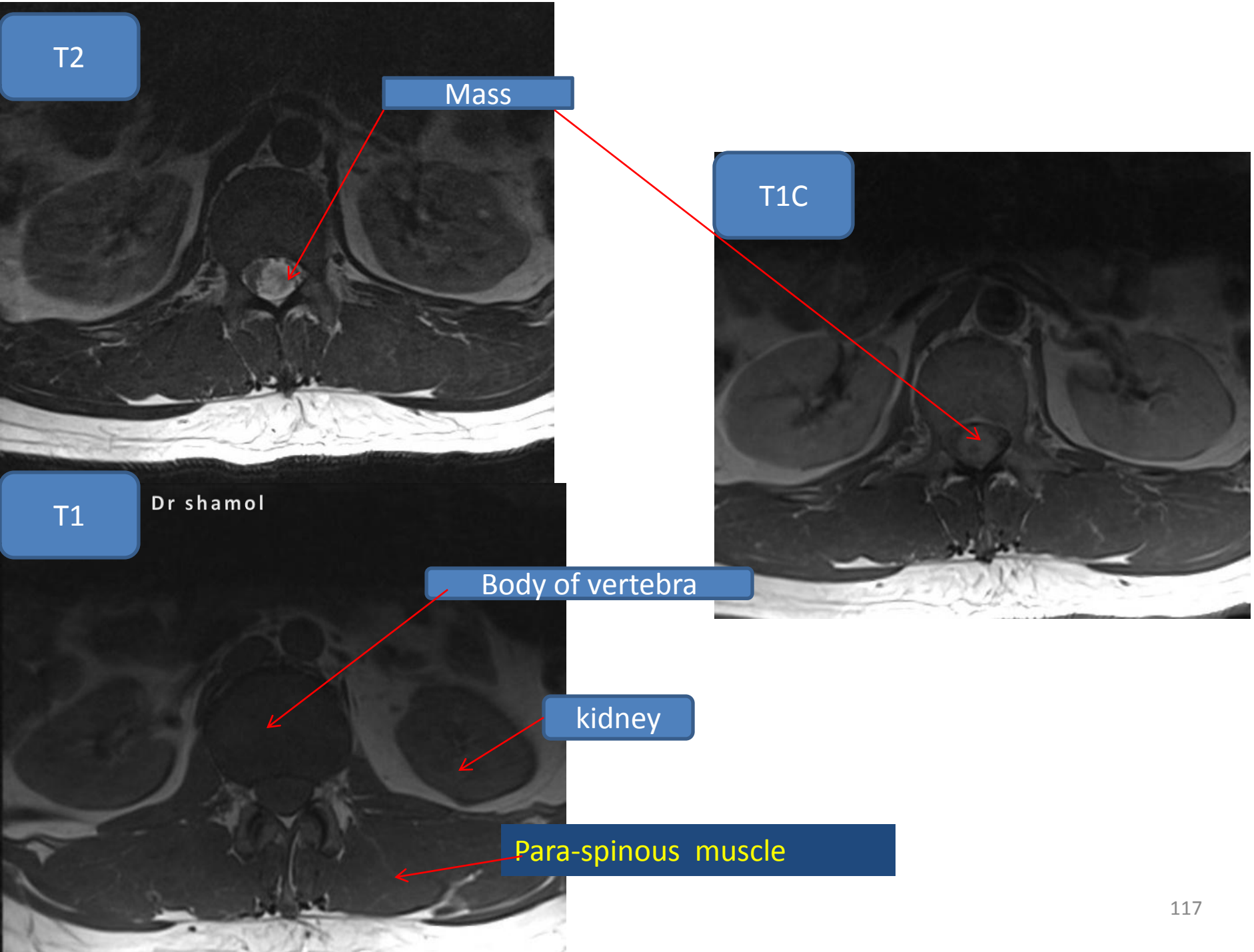

T1

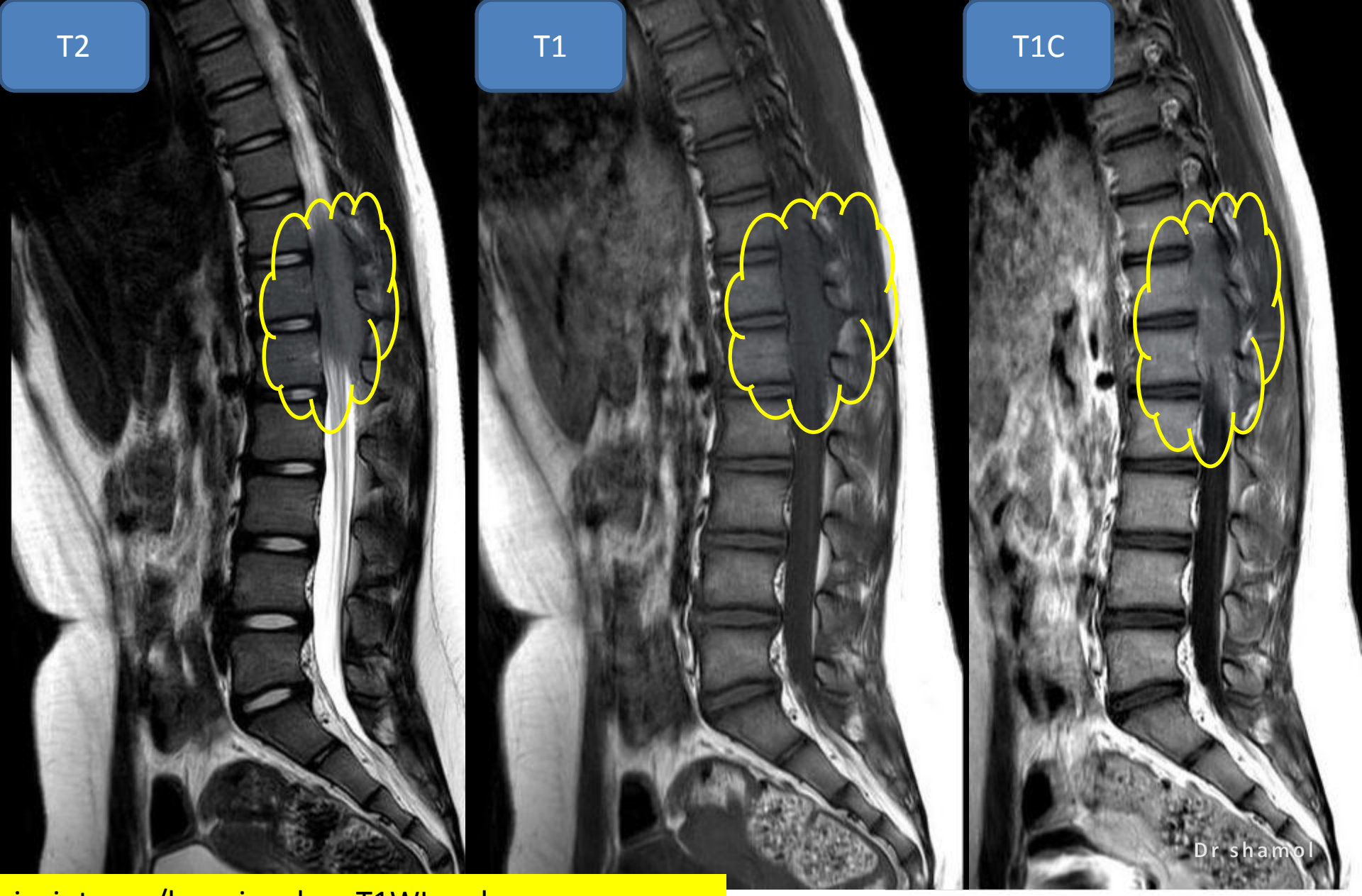

T1C
mass
Dr shamol



The mass is isointense to cord on T1 and demonstrates vivid fairly homogeneous contrast enhancement. The mass displays heterogeneous T2 signal .

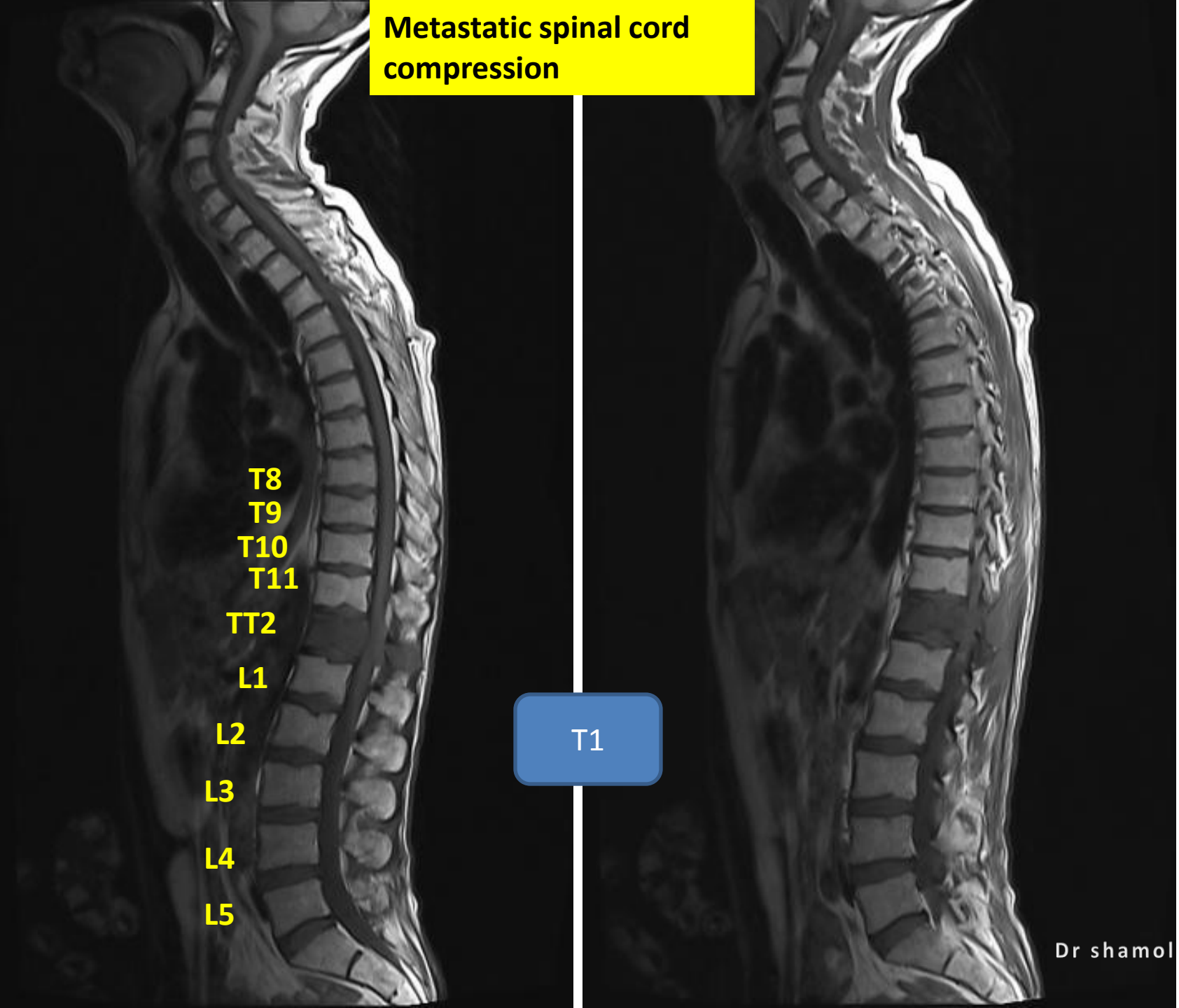
There is a wedge compression fracture of the L2 vertebral body associated with moderate loss of height.

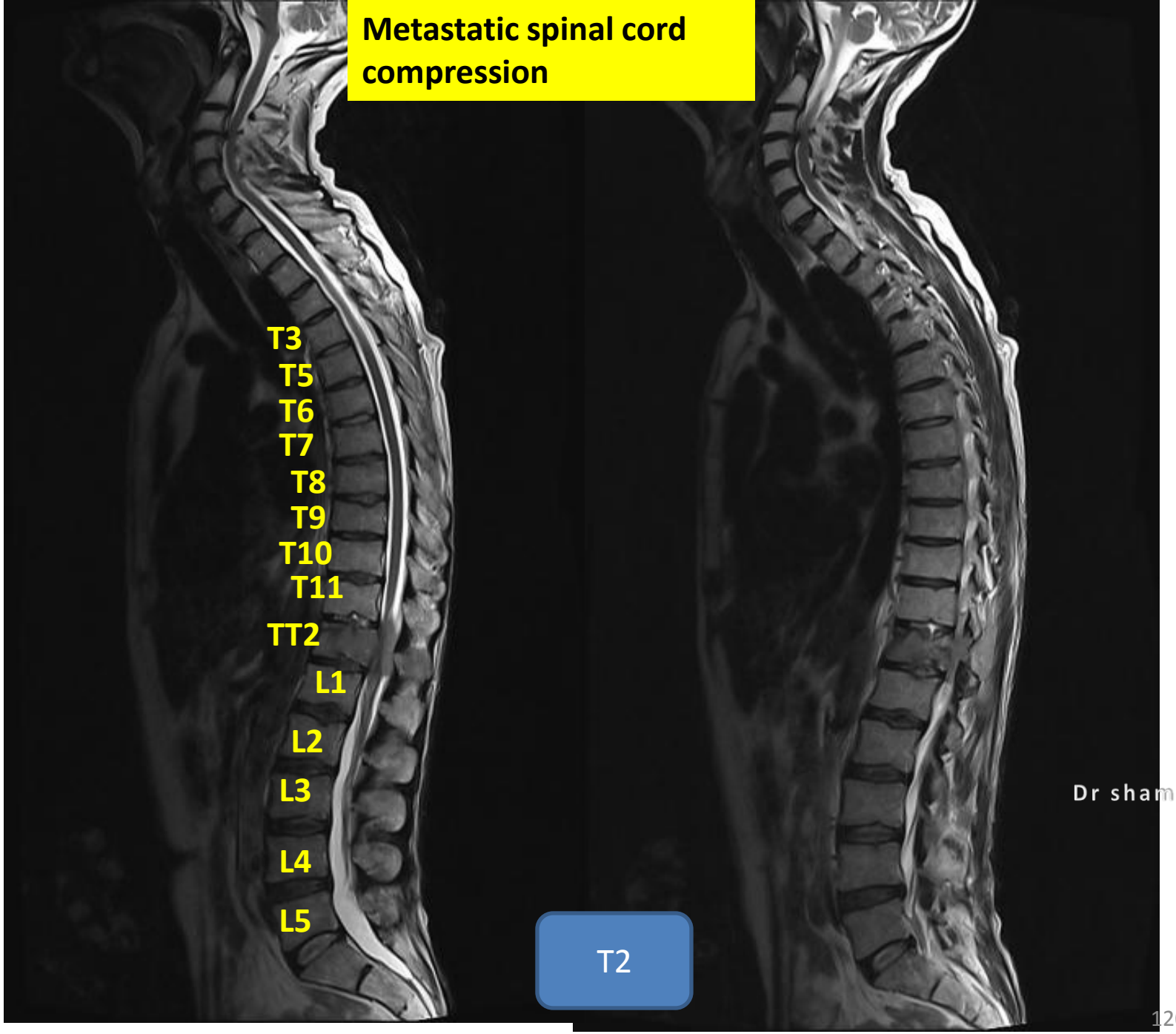

T2
Mass
T1C
T1
Dr shamol
Body of vertebra
kidney
Para-spinous muscle



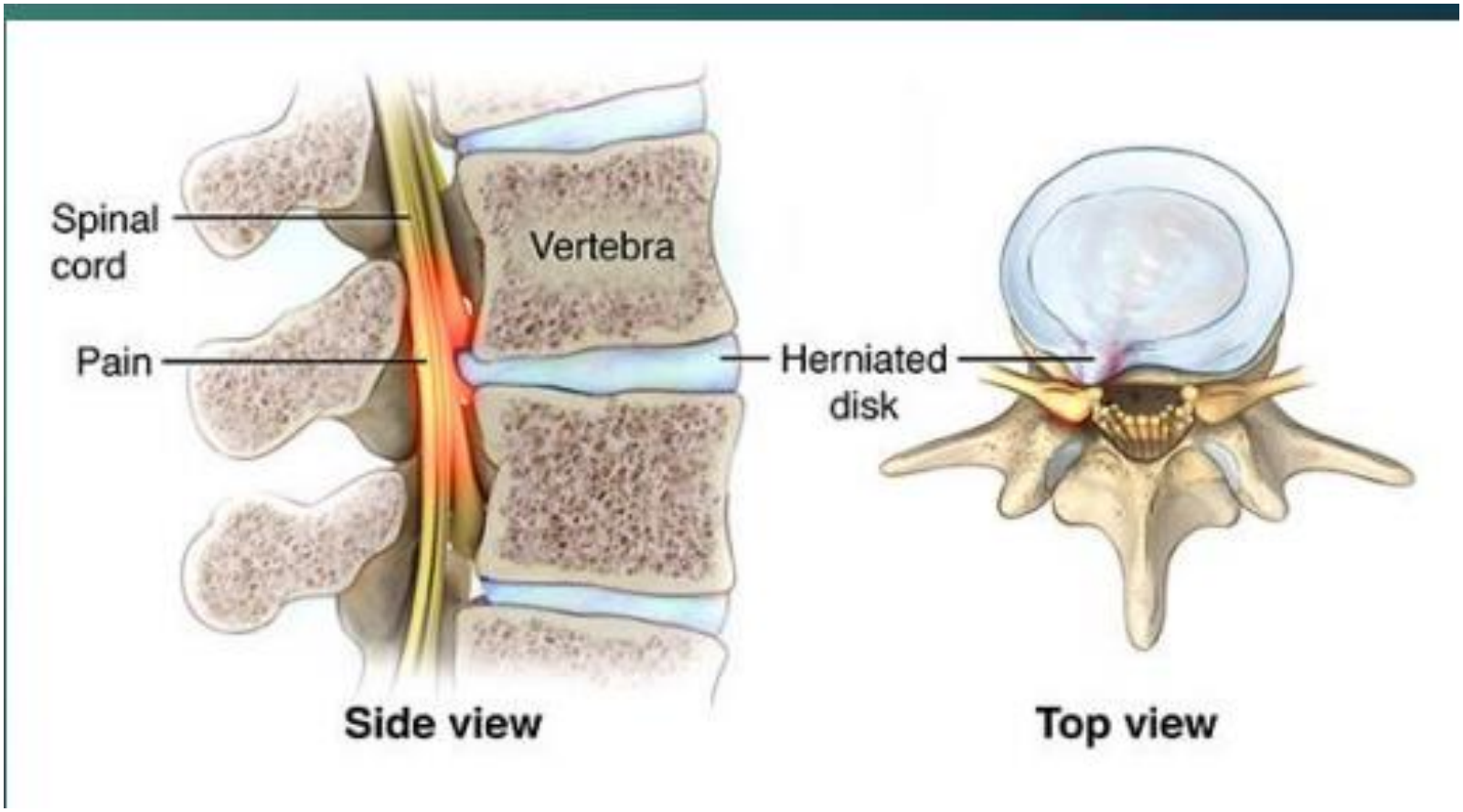
isointense/low signal on T1WI and
high signal on T2WI,
homogeneous post contrast enhancement.

non Hodgkin lymphoma.


Metastatic spinal cord compression
T8
T9
T10
T11
TT2
L1
L2
L3
L4
L5
T1
Dr shamol


Metastatic spinal cord compression
T3
T5
T6
T7
T8
T9
T10
T11
TT2
L1
L2
L3
L4
L5
T2
Dr shamol

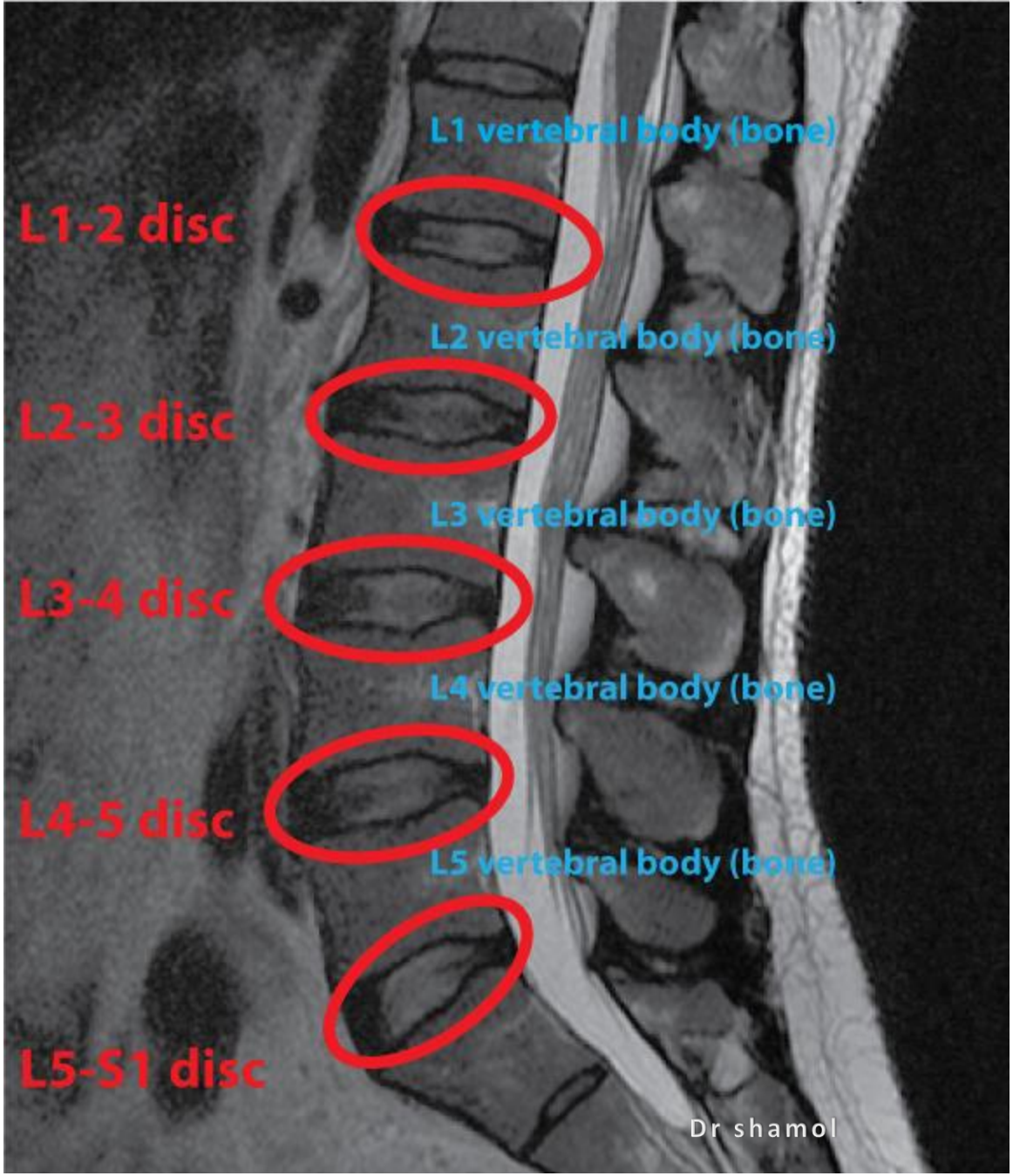
Discs	Height loss
	Bulge/protrusion
	Discitis
	Degenerative disc



the intervertebral discs are numbered from L1-2 to L5-S1 based on their location between the vertebral bodies.

Discs have a great deal of fluid within them which allow them to act as shock absorbers

but over time the discs can begin to dry out and degenerate.

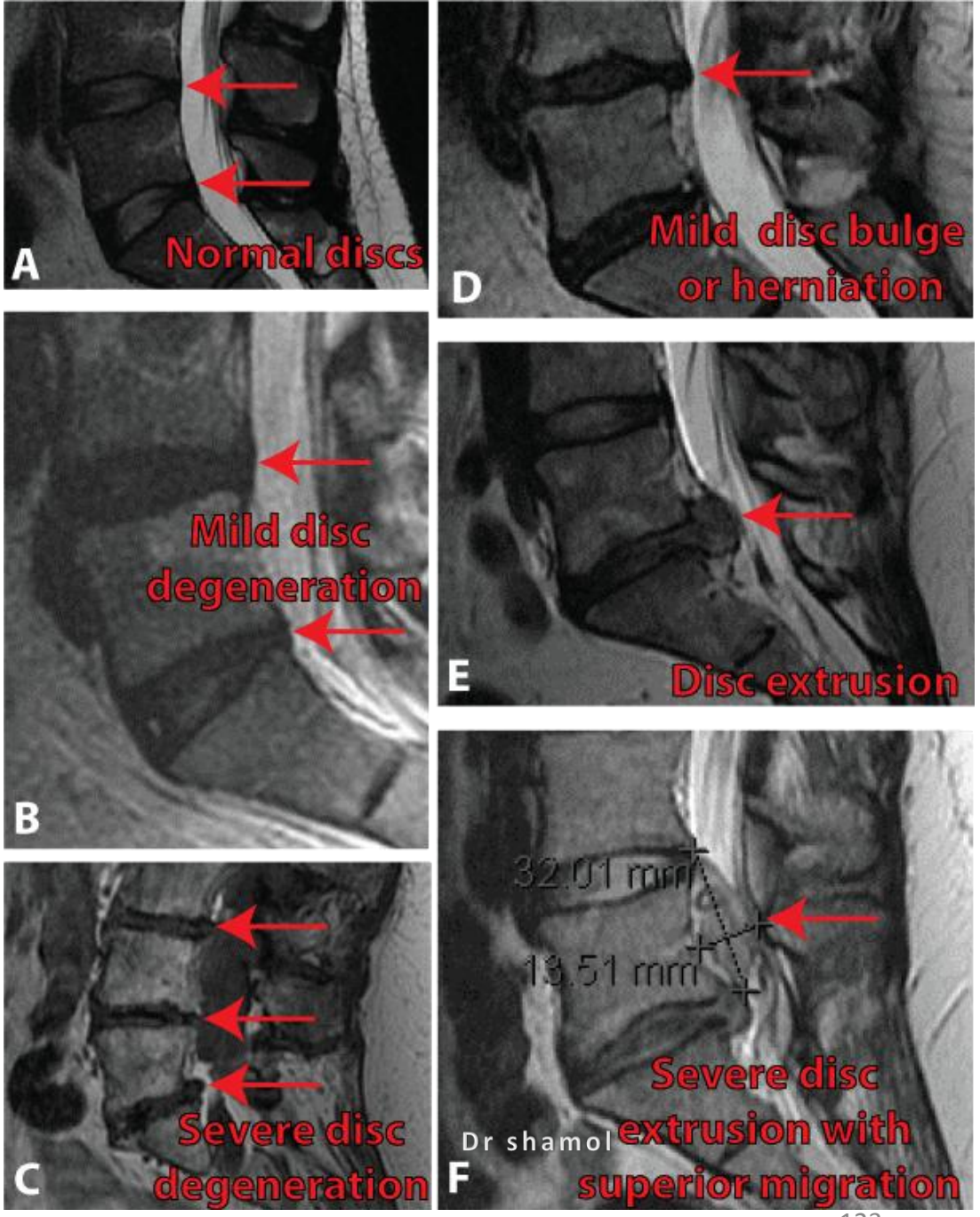


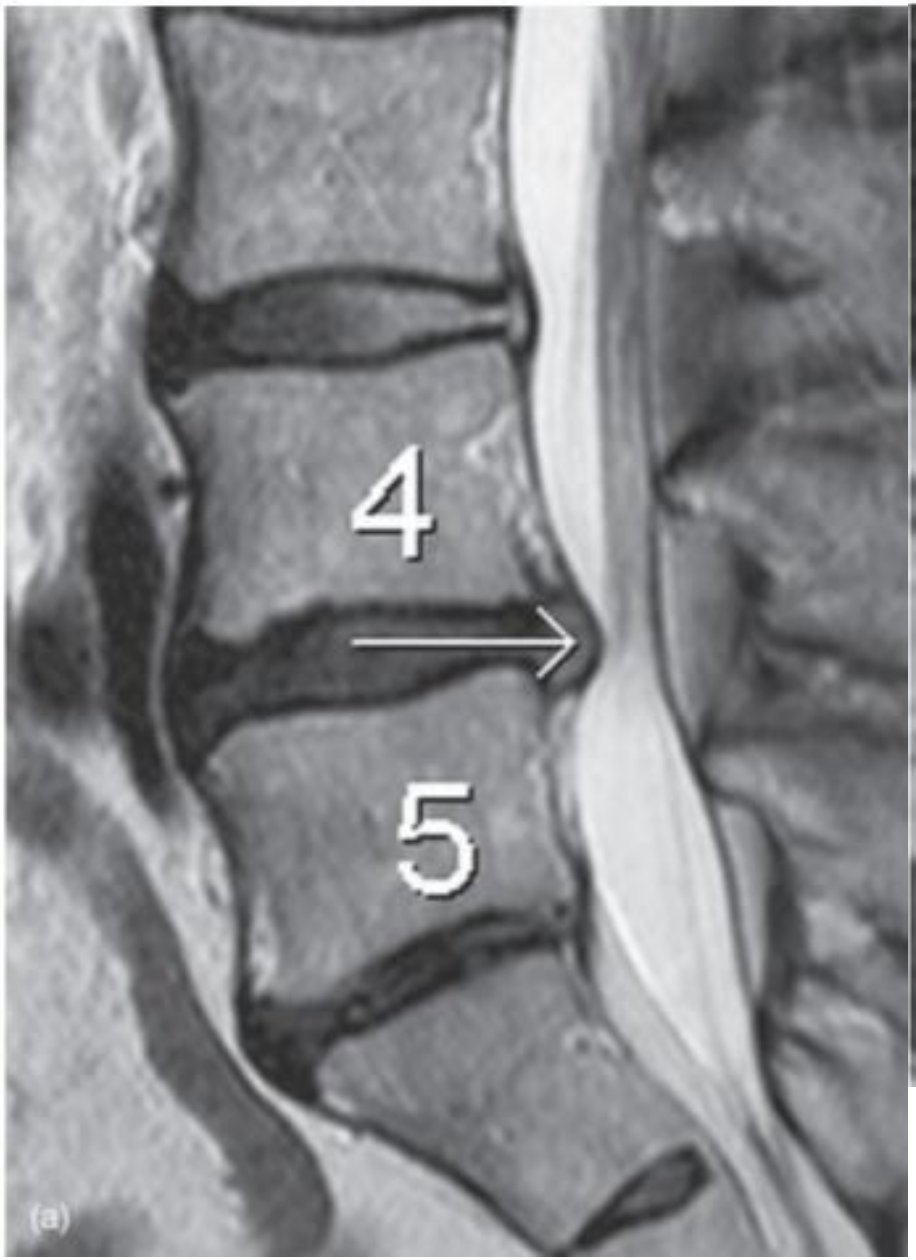
normal intervertebral disc has significant white signal internally (figure A) which represents normal fluid.

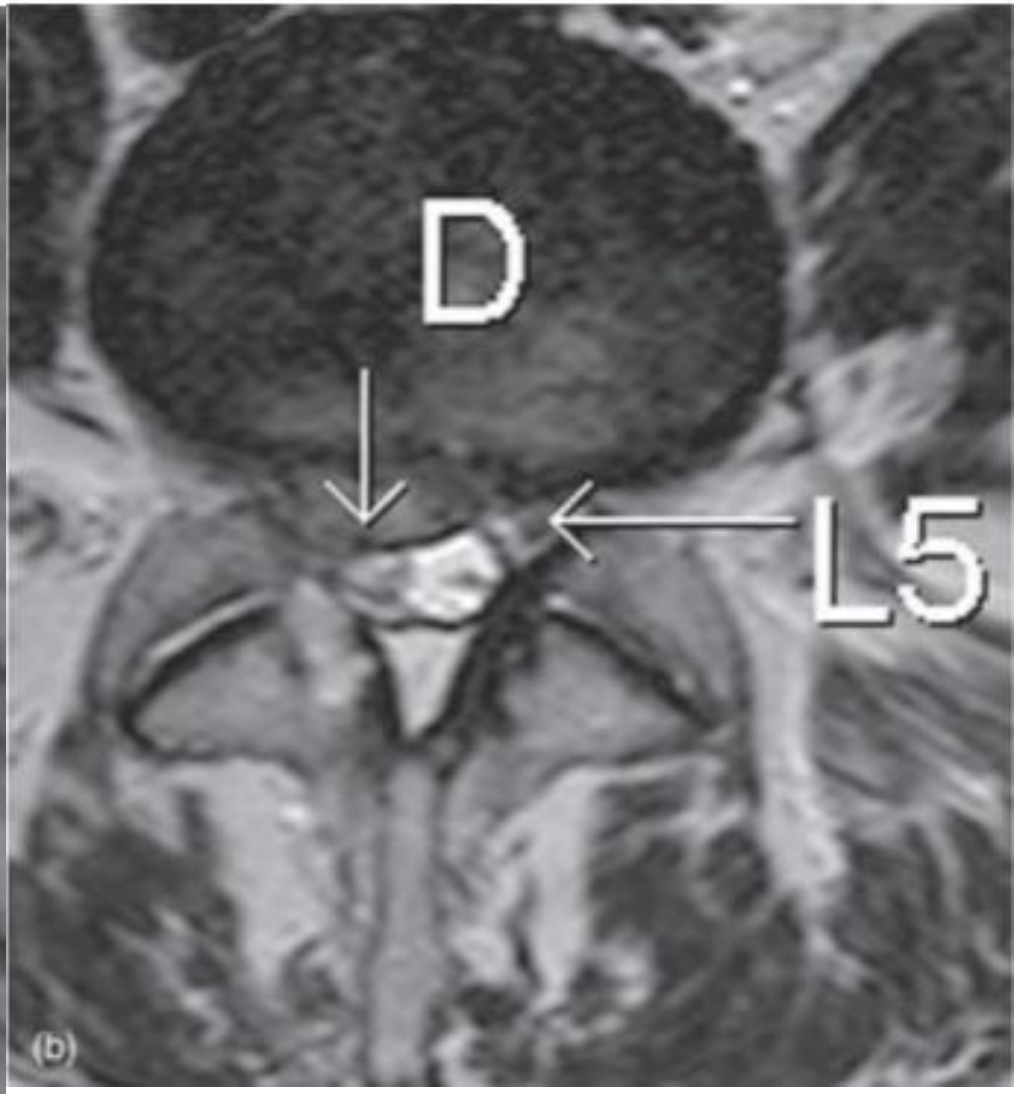
As the intervertebral disc degenerates, the normal white signal is lost become black (figure B).

Without the fluid, the disc begins to narrow and degenerate further (figure C).

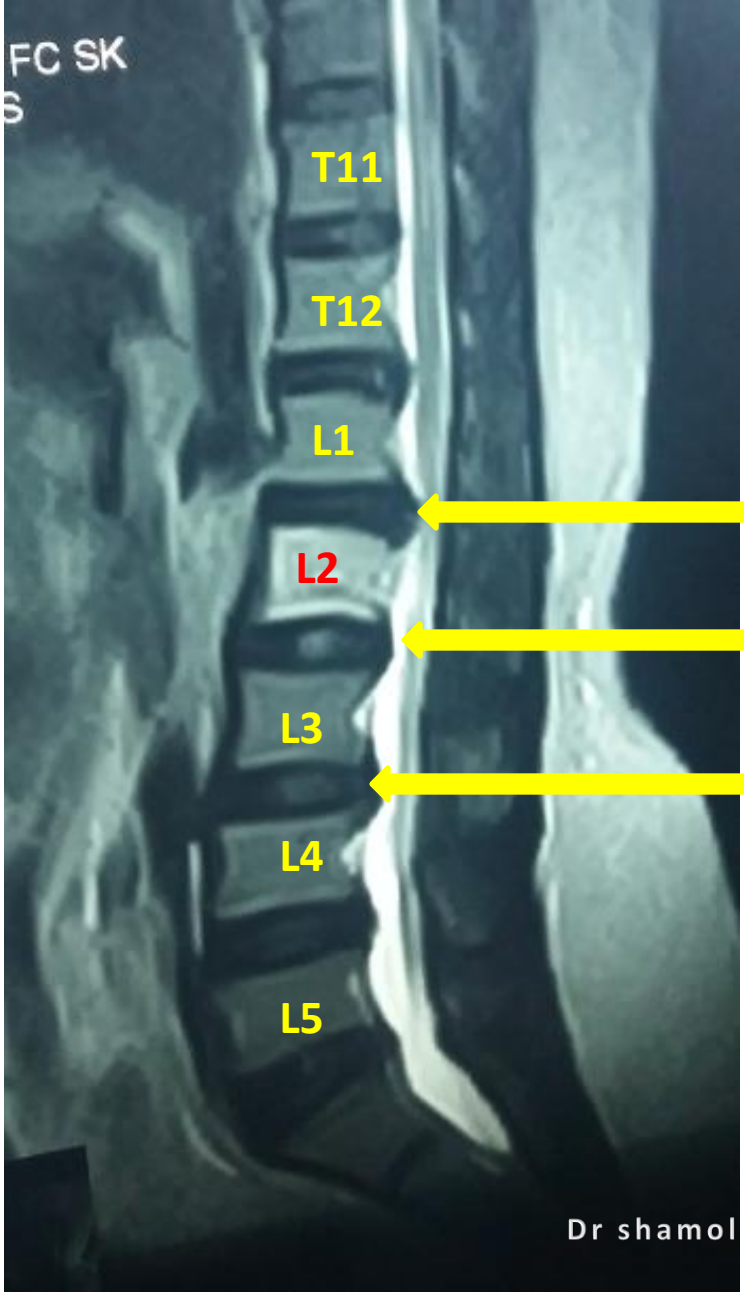
With loss of the interior supporting fluid, the thick collagen walls of the disc begin to bulge outwards into the central canal from the excessive pressure (figure D).




4
5
(a)


D
L5
(b)



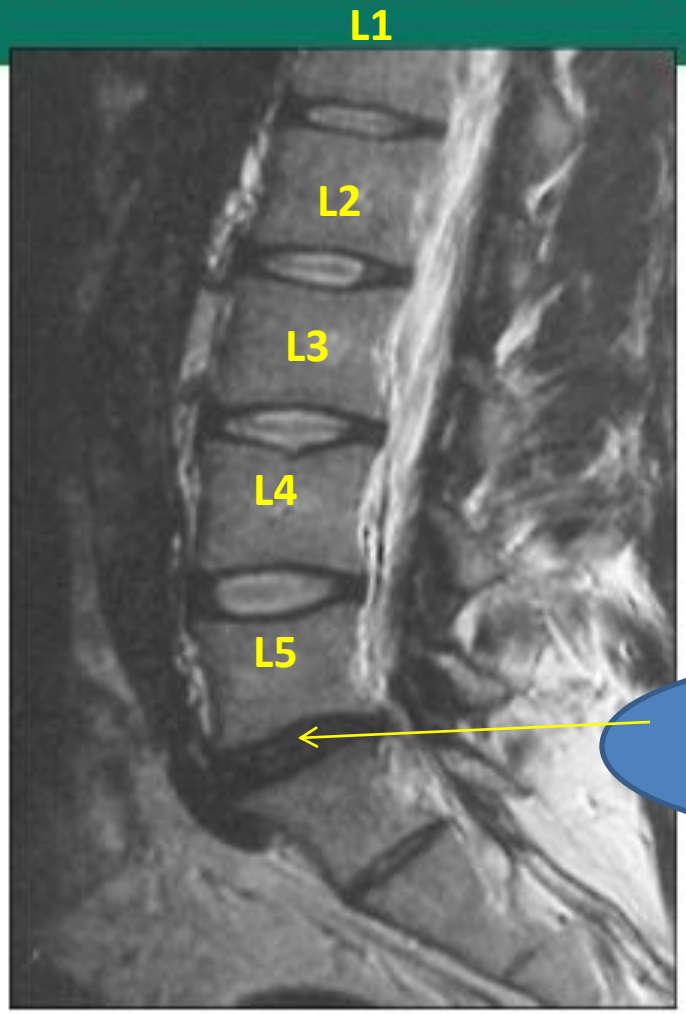


Posterior indentention

Degenerative disc diseases

Dr shamol

what black disc means?



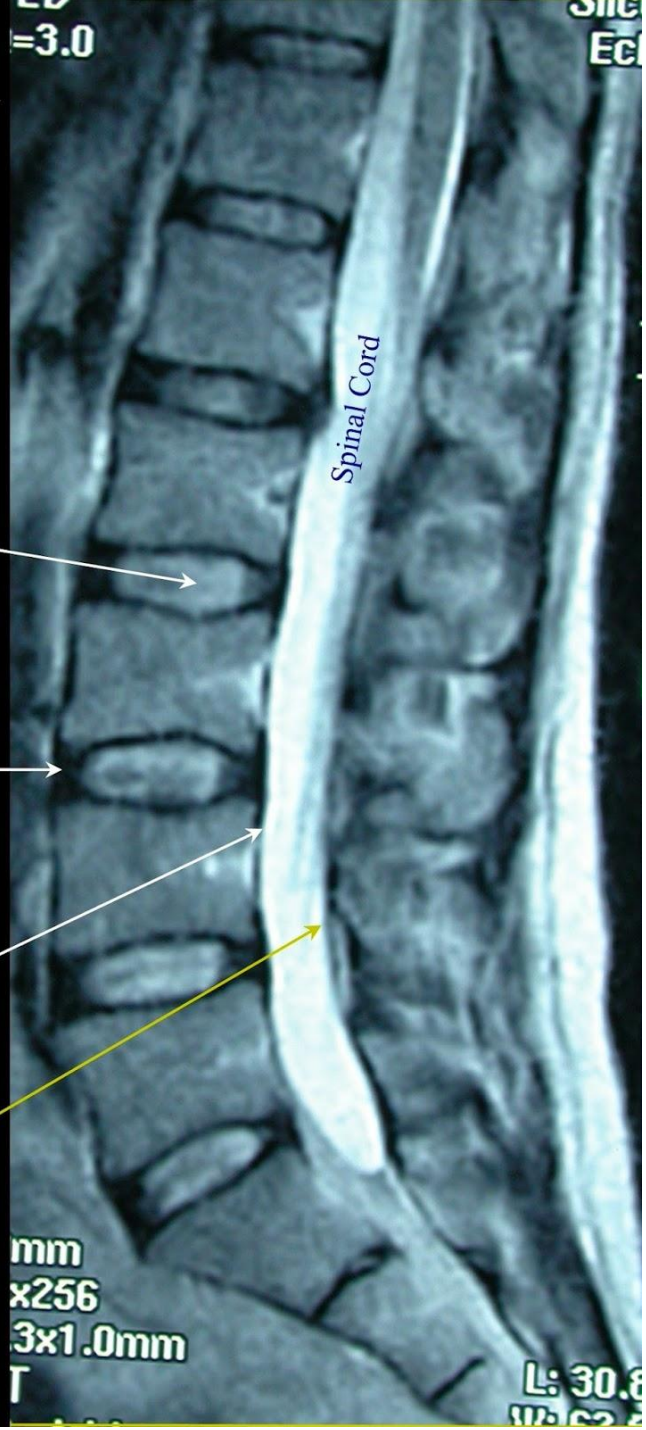
Black disc
Means
degenerative



✓ MRI image corresponding with a degenerative disk disease degree IV

Pfirmann 2001

Normal MRI
This is an example of a normal MRI (except for the small disc buldge at L1-2. Note the appearance of the normal disc. A normal disc is well hydrated and has a whitish appearance on the MRI. The outer portion of the disc is the tough annulus which appears black. The spinal canal is wide and cylindrical.



Nucleus of Discs with normal whitish appearance

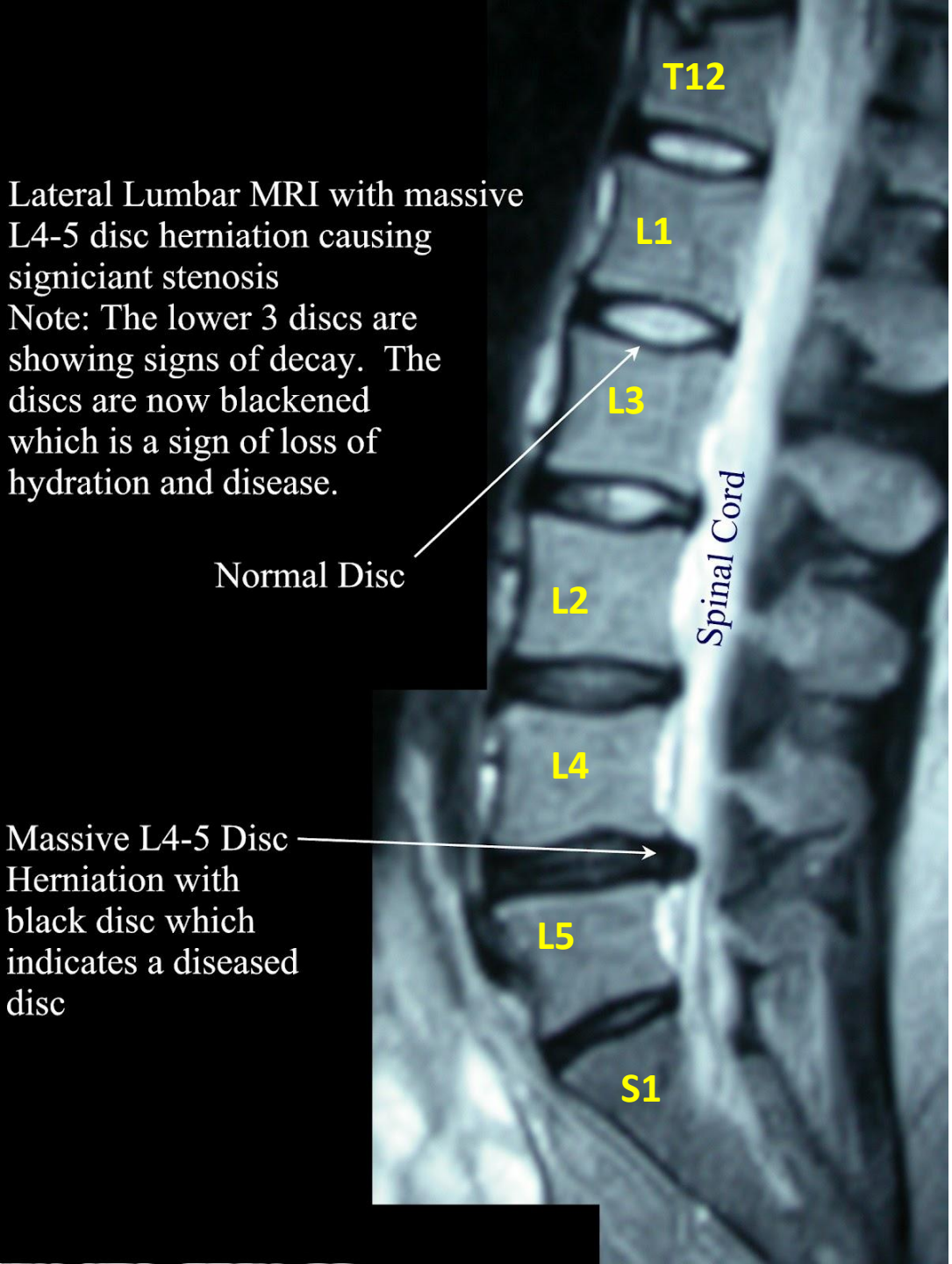
Annulus of disc with normal solid black appearance. There are no cracks or herniations posteriorly.

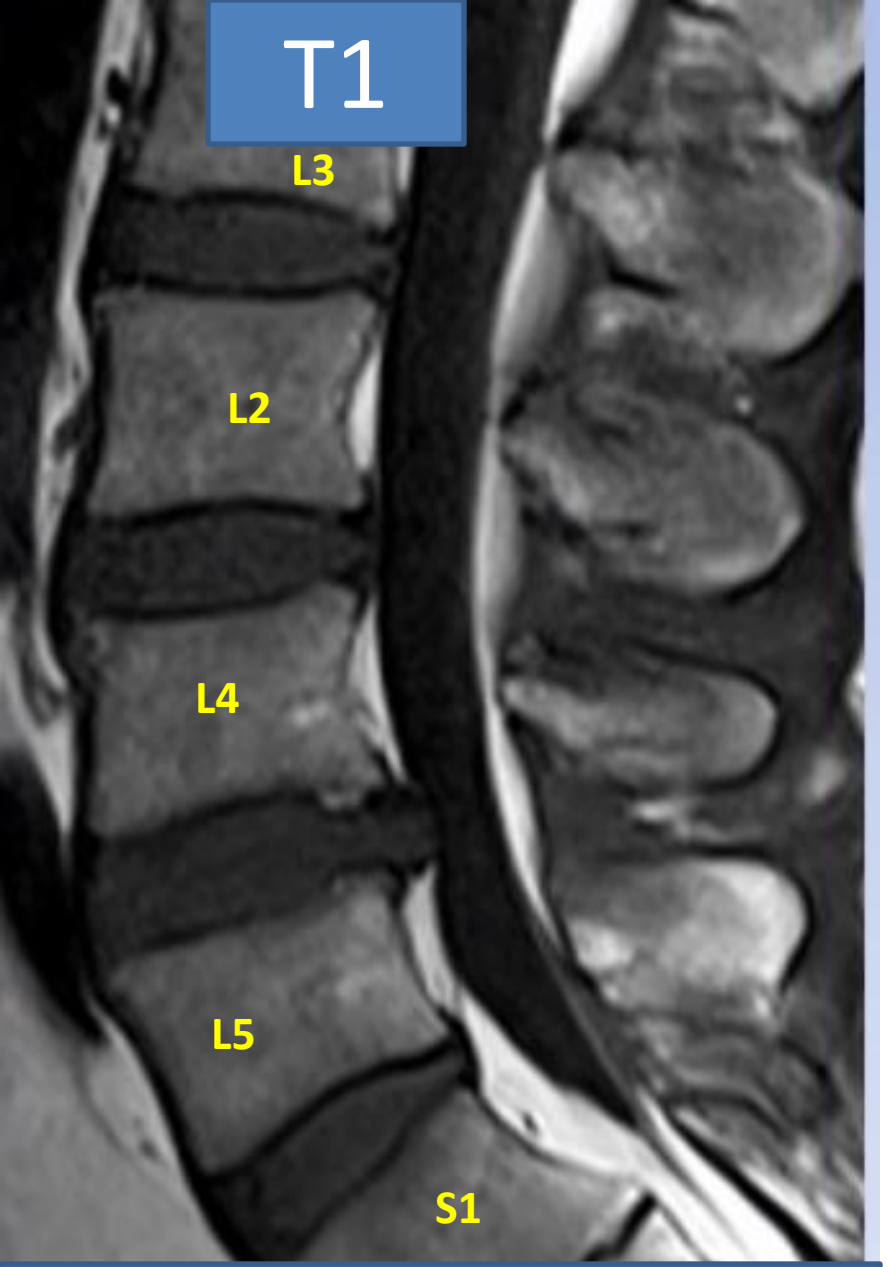
Smooth cylindrical shape of spinal cord without any disc buldges on the cord.

No Posterior Bone Spurs are present that would cause cord compression

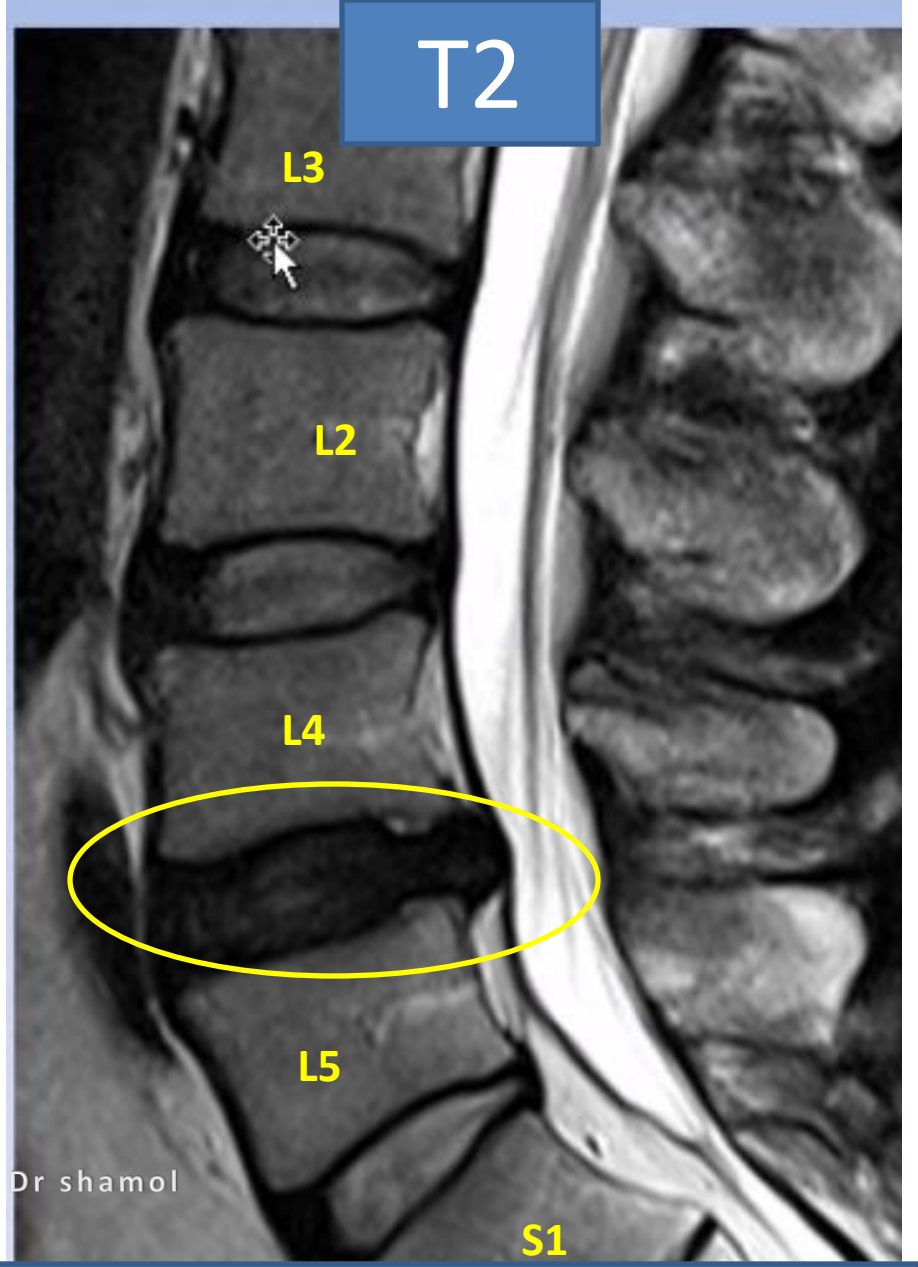
Dr shamol


MRI showing Degenerative Disc Disease
T12
L1
L2
L3
L4
L5
Spinal Cord & Cerbrospinal Fluid (CSF)
Healthy Discs
The discs are white showing the nucleus
Unhealthy Discs (Dessicated Disc) are dark or almost black in colour
4000 /88
6.0 /7.0mm
256 x240 NEX4
330x330mm
5m20s000ms
(F,P)
LT+8.5mm
F

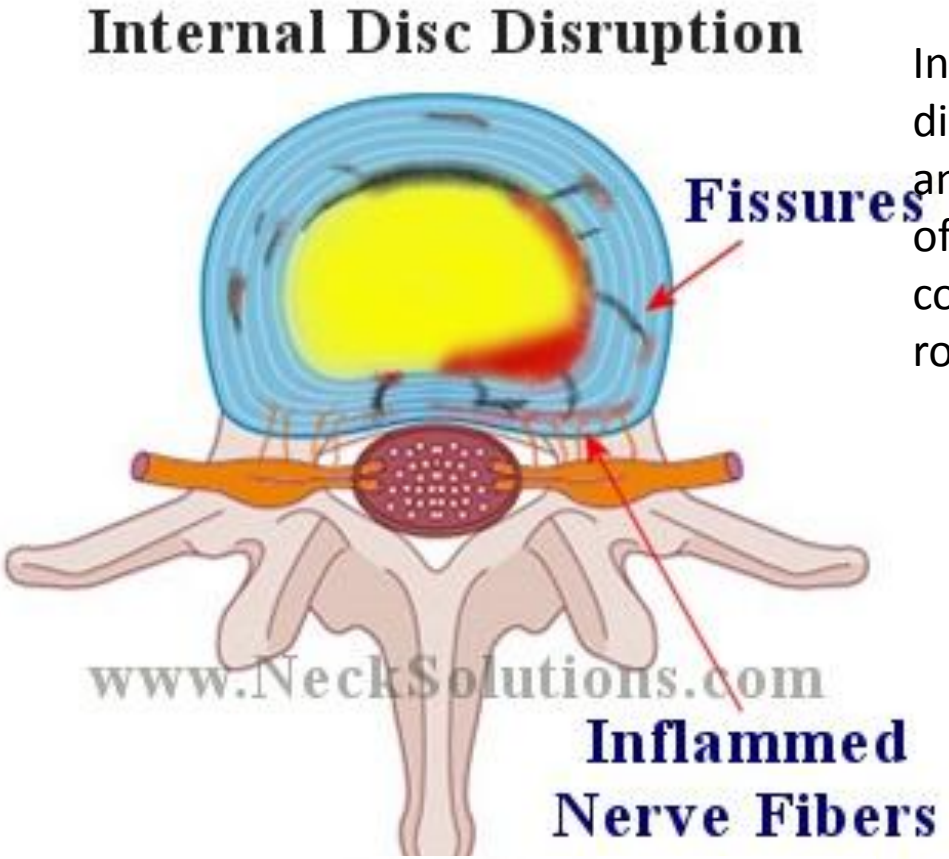

Lateral Lumbar MRI with massive L4-5 disc herniation causing signiciant stenosis
Note: The lower 3 discs are showing signs of decay. The discs are now blackened which is a sign of loss of hydration and disease.
Normal Disc
Massive L4-5 Disc Herniation with black disc which indicates a diseased disc
T12
L1
L3
L2
L4
L5
S1
Spinal Cord



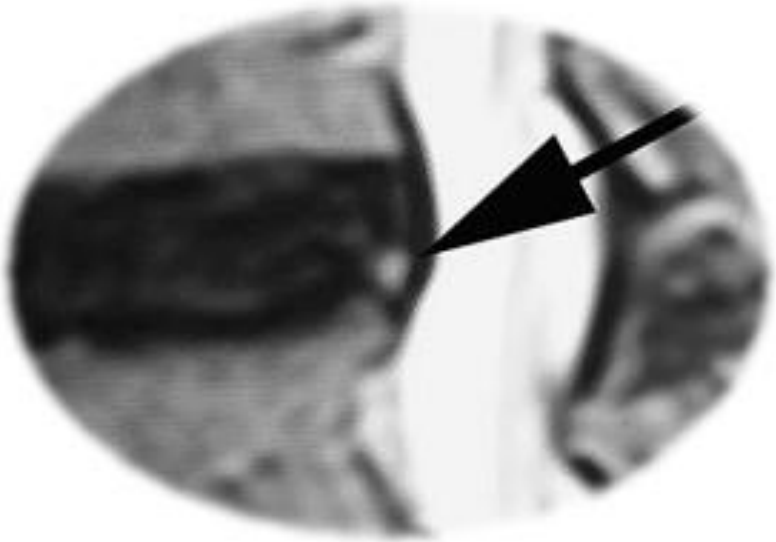
Disc degeneration cant assess in T1
As all disc are hypotense / black in T1



Degenerative disc is black in T 2

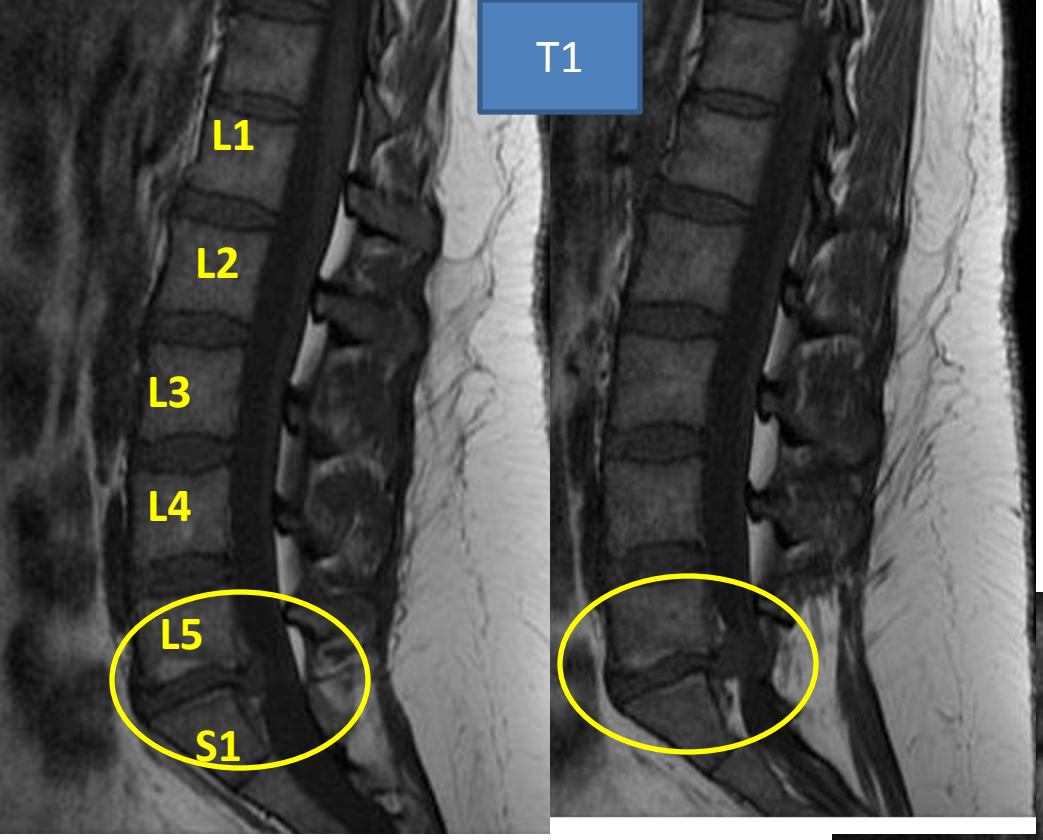


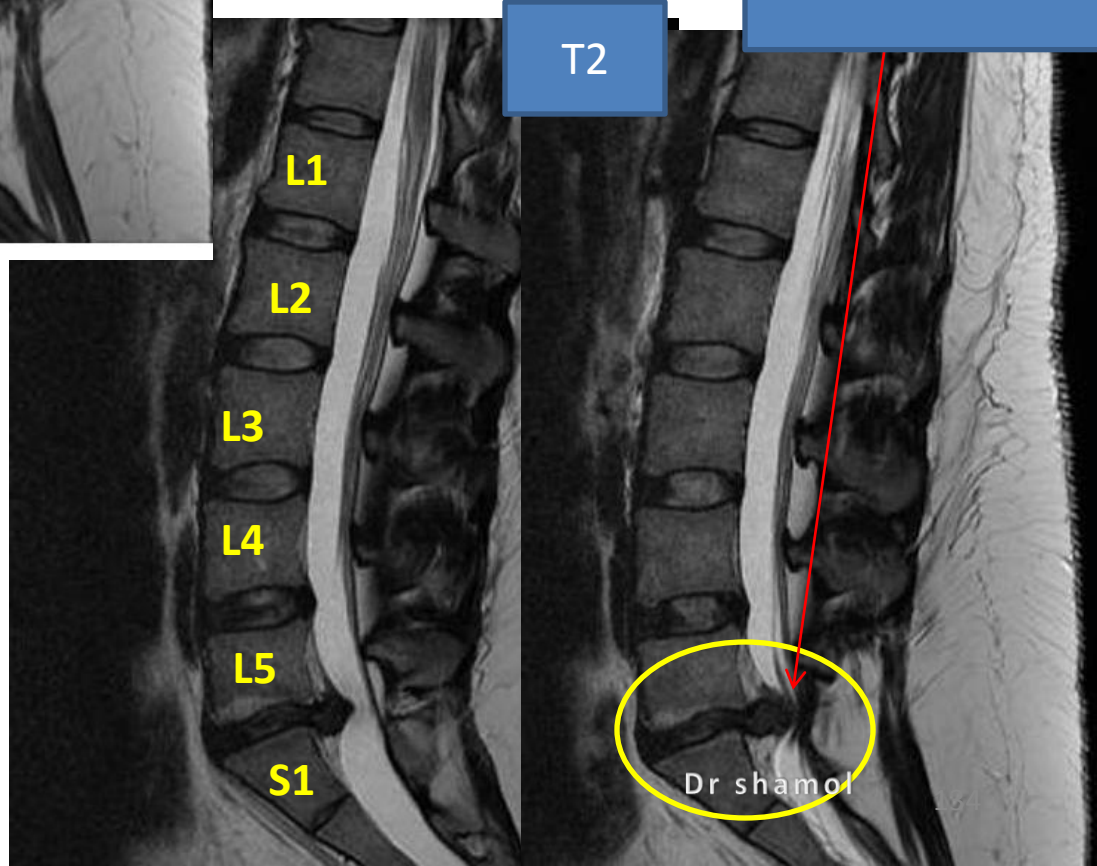
Internal disc disruption shows a loss of normal distinction between the nucleus and the annulus, disorganization and fissuring (tearing) of the annulus, a preserved external disc contour and appearance and absence of nerve root compression. T

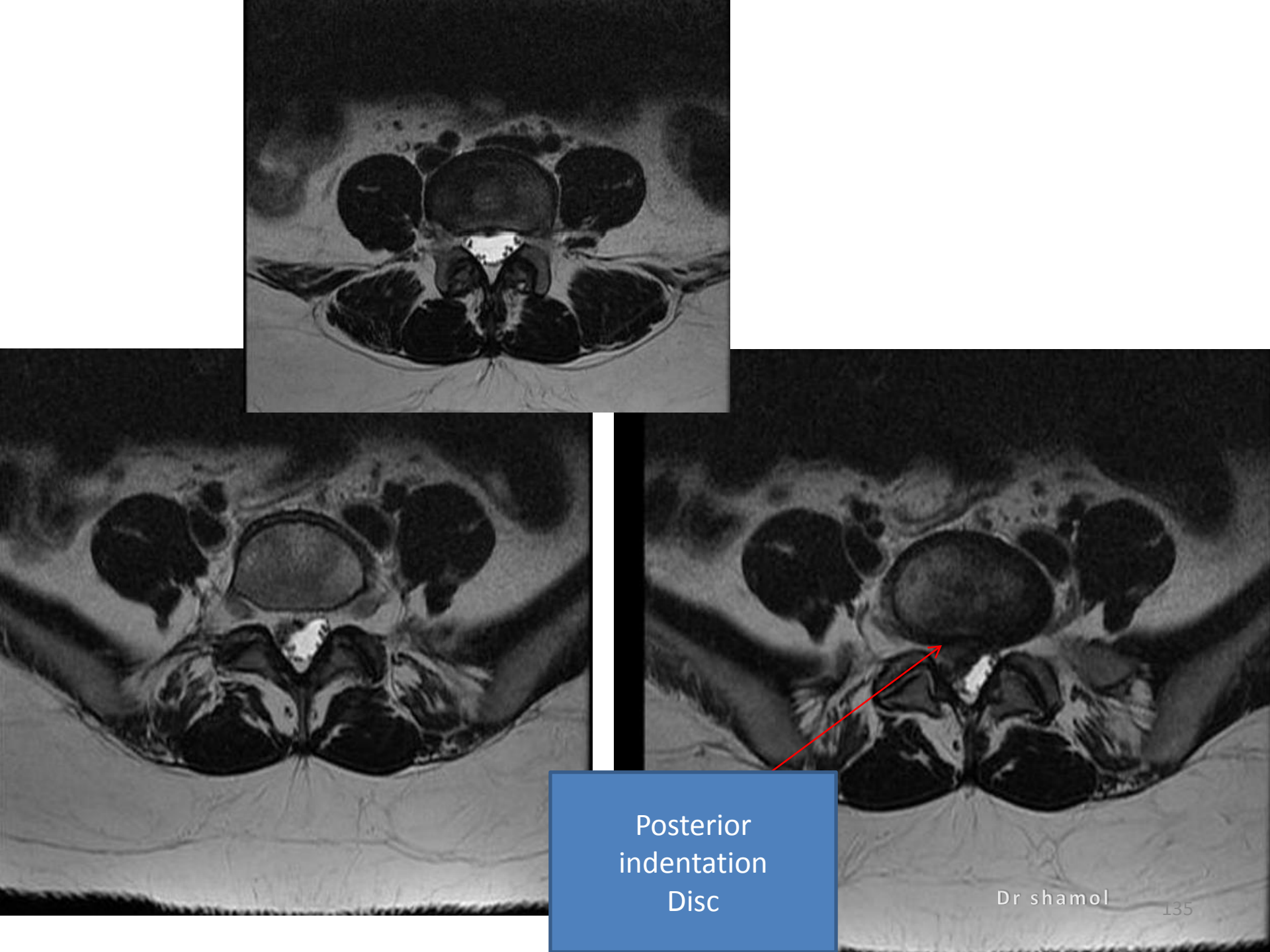


indicates annulus tears, indicated on MRI by a high intensity zone (HIZ), cause high levels of inflammation responsible for back pain. The authors found that a disc with moderate levels of degeneration and a high intensity zone is diagnostic of a painful herniated disc.

CASE # ONE
Degenerative disc & herniation


T1
L1
L2
L3
L4
L5
S1


T2
Posterior indentation Disc
L1
L2
L3
L4
L5
S1
Dr shamol

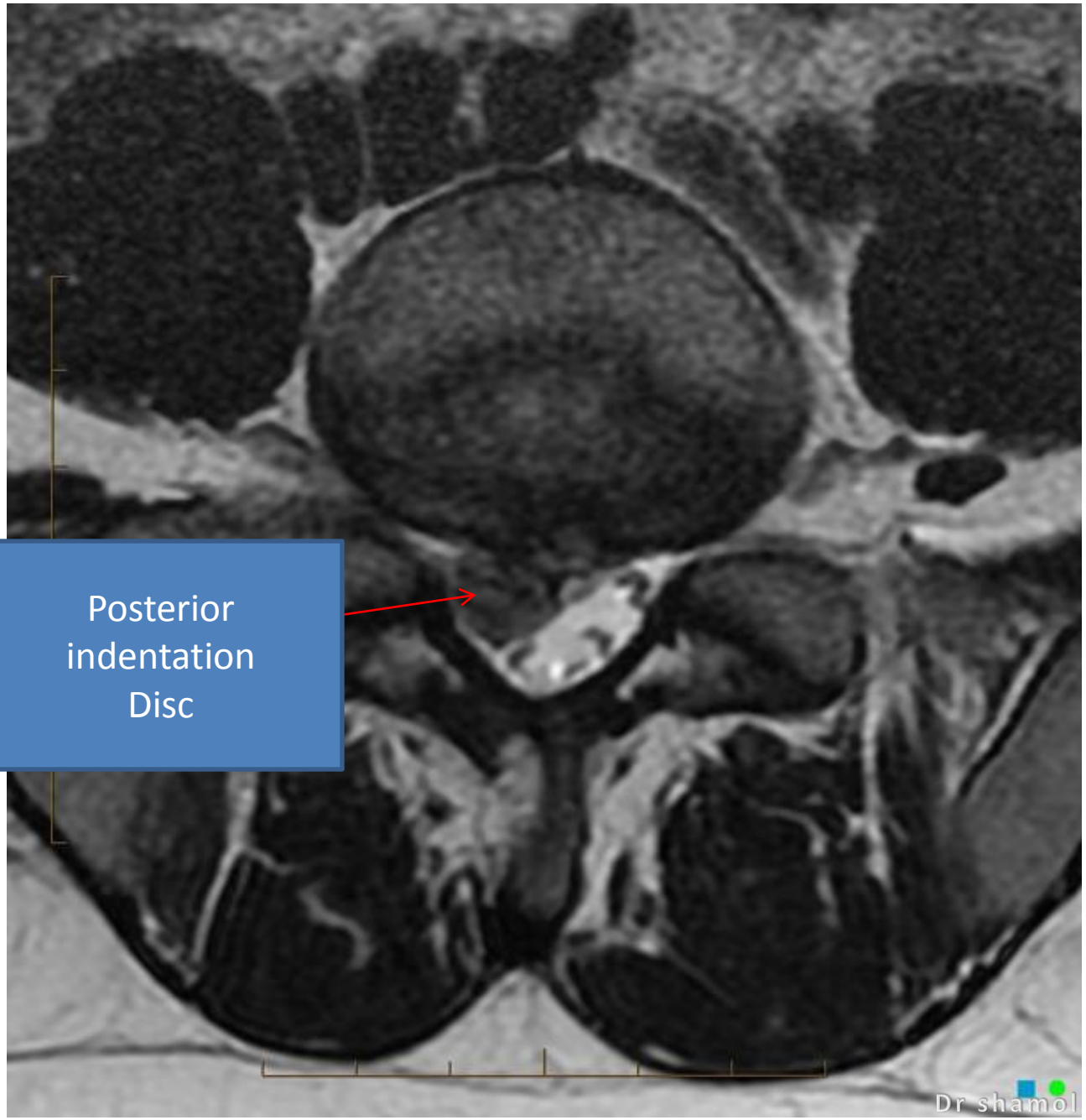

Posterior
indentation
Disc

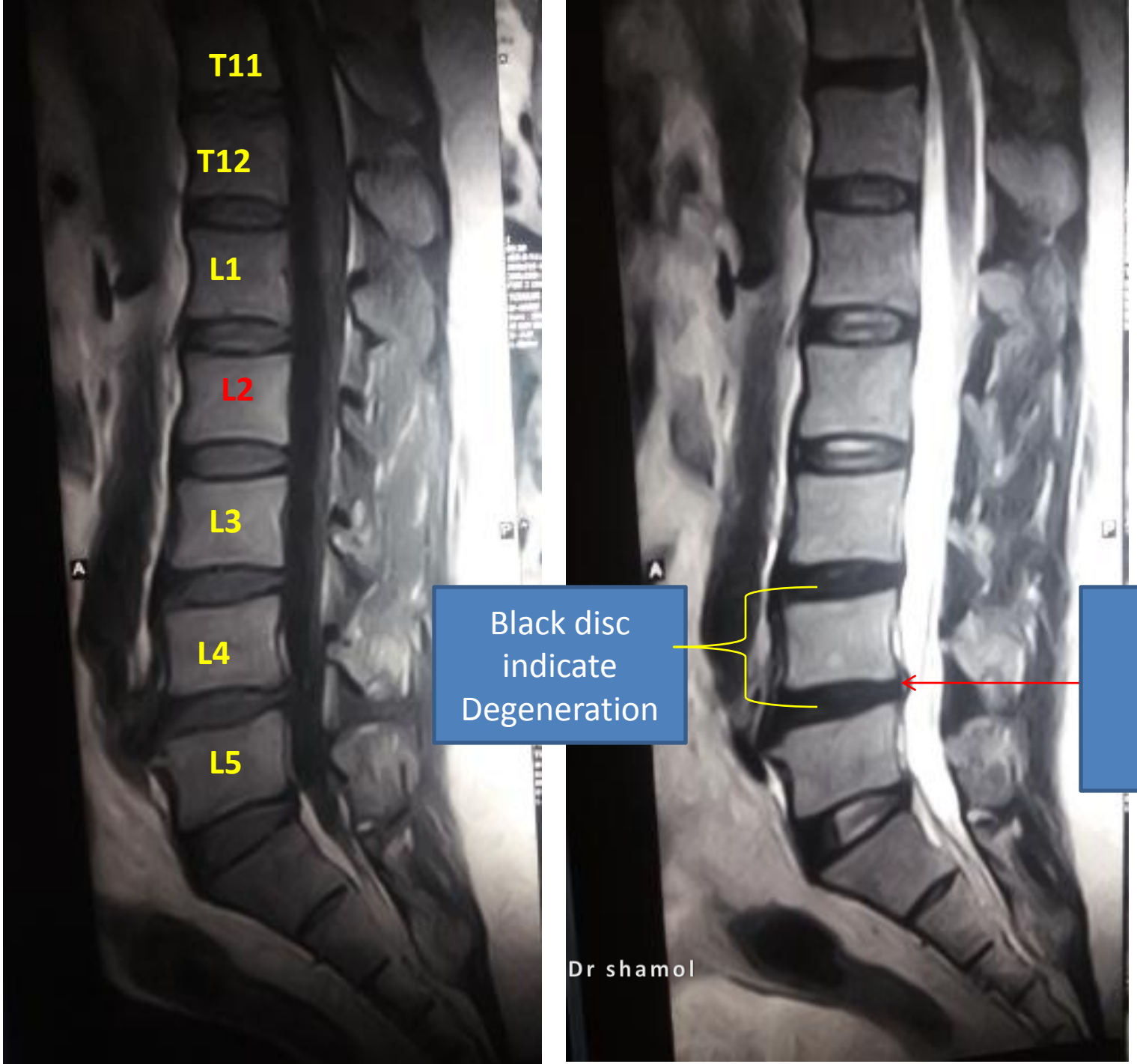

CASE 2

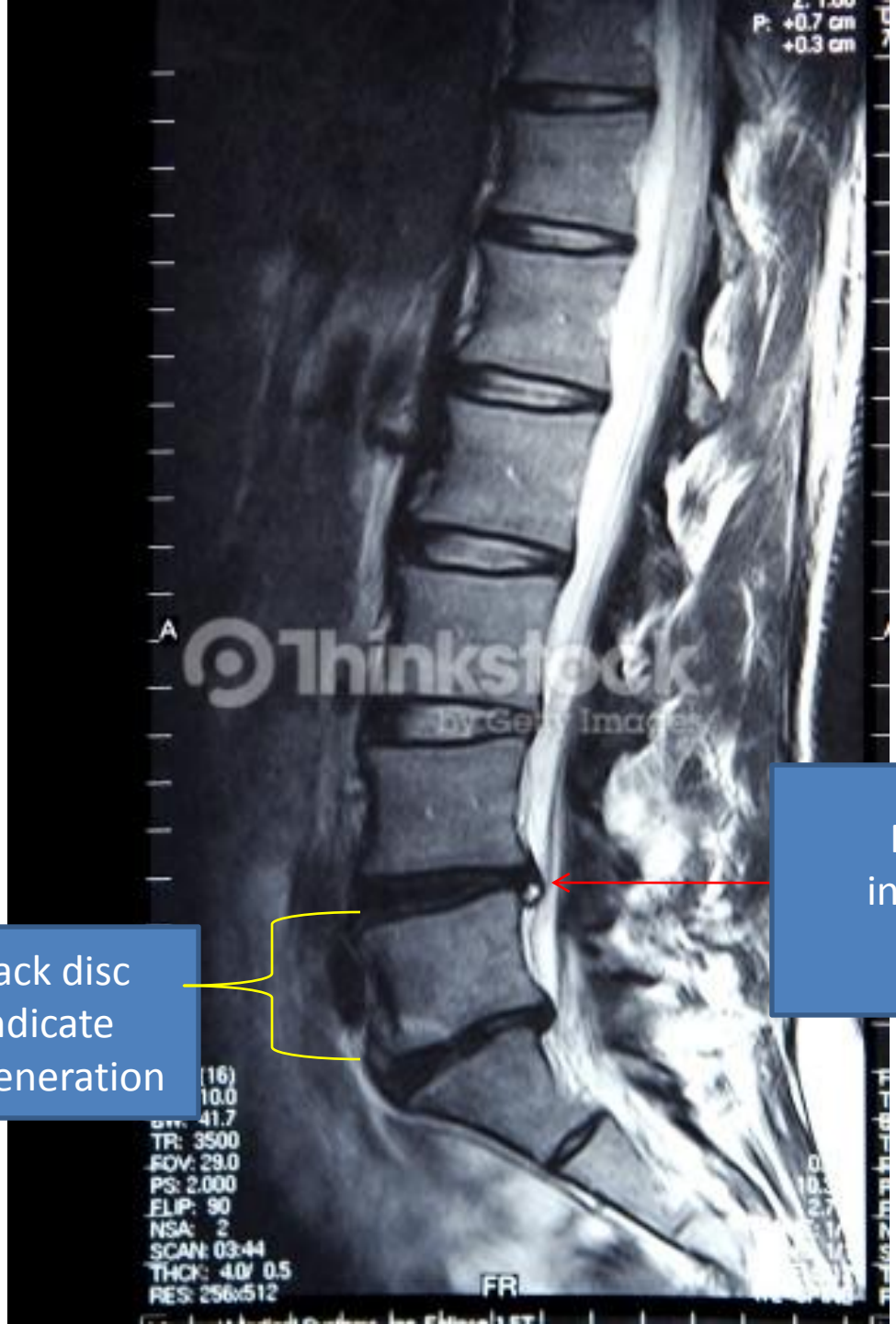




Posterior indentation Disc


Posterior
indentation
Disc
Dr shamol

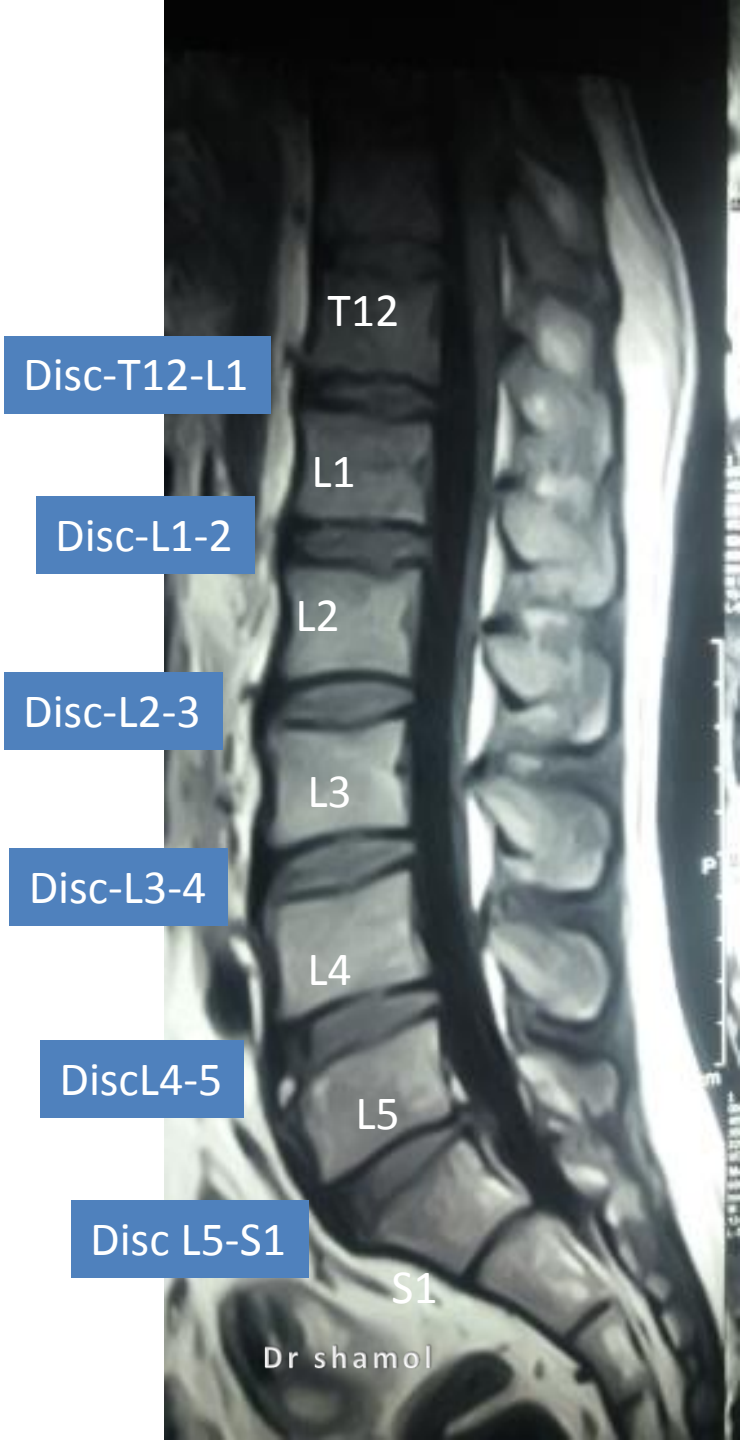

T11
T12
L1
L2
L3
L4
L5
Black disc indicate Degeneration
Posterior indentation Disc
Dr shamol



Black disc indicate Degeneration

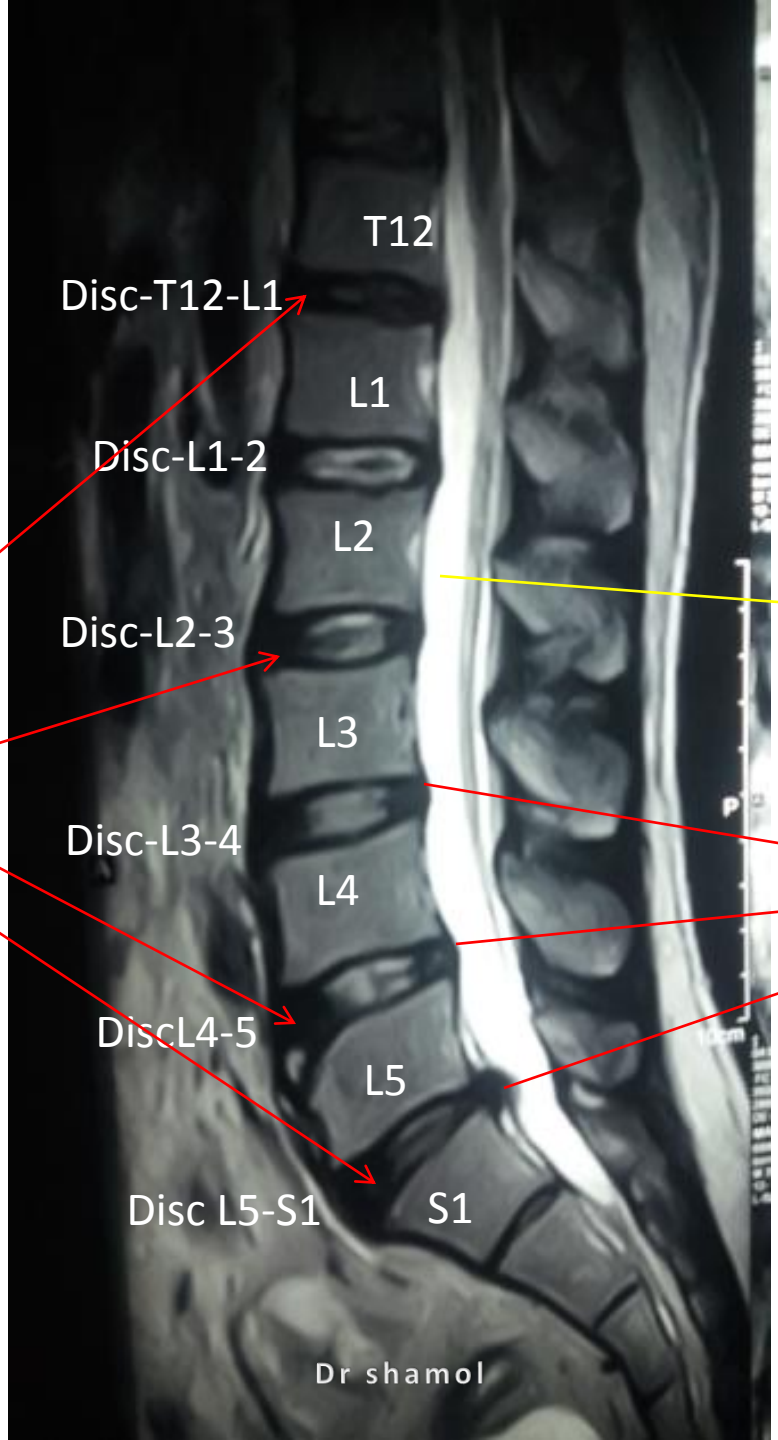
Posterior indentation Disc

LUMBER SPONDYLOSIS #1


T12
Disc-T12-L1
L1
Disc-L1-2
L2
Disc-L2-3
L3
Disc-L3-4
L4
DiscL4-5
L5
Disc L5-S1
S1
Dr shamol


T12
L1
L2
L3
L4
L5
S1
Dr shamol

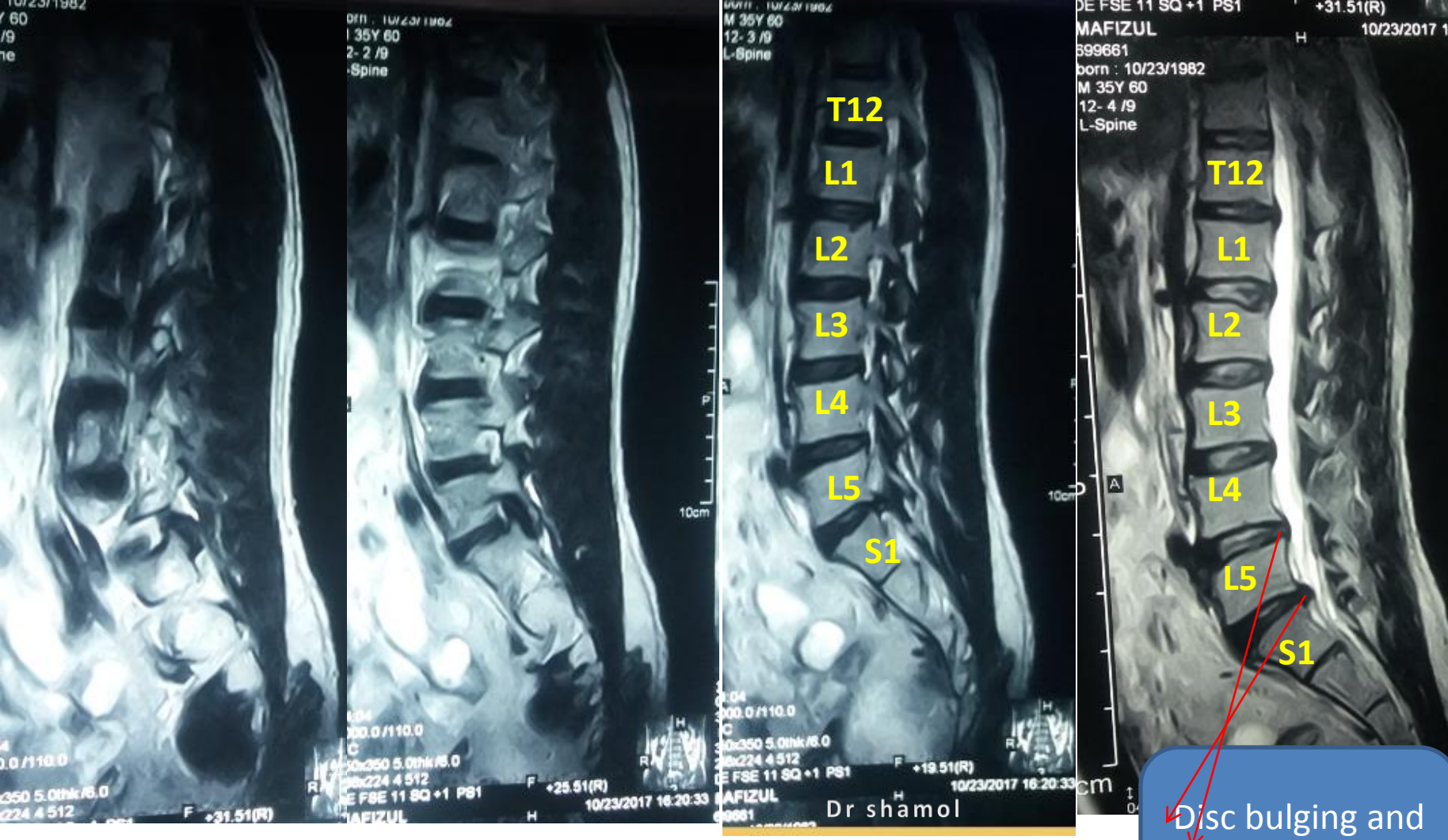

T12
L1
L2
L3
L4
L5
S1
Dr shamol

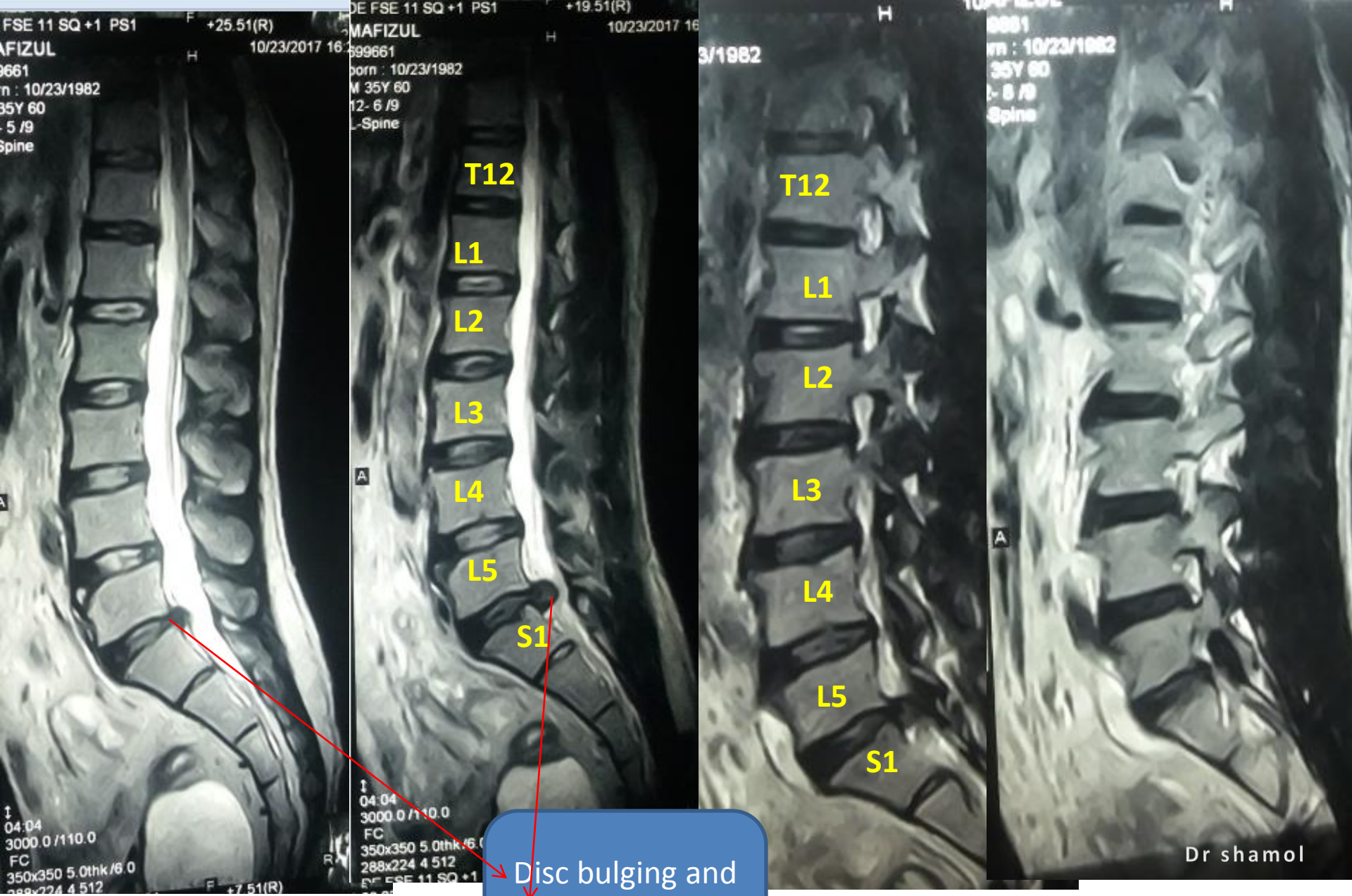


Degenerative Disc

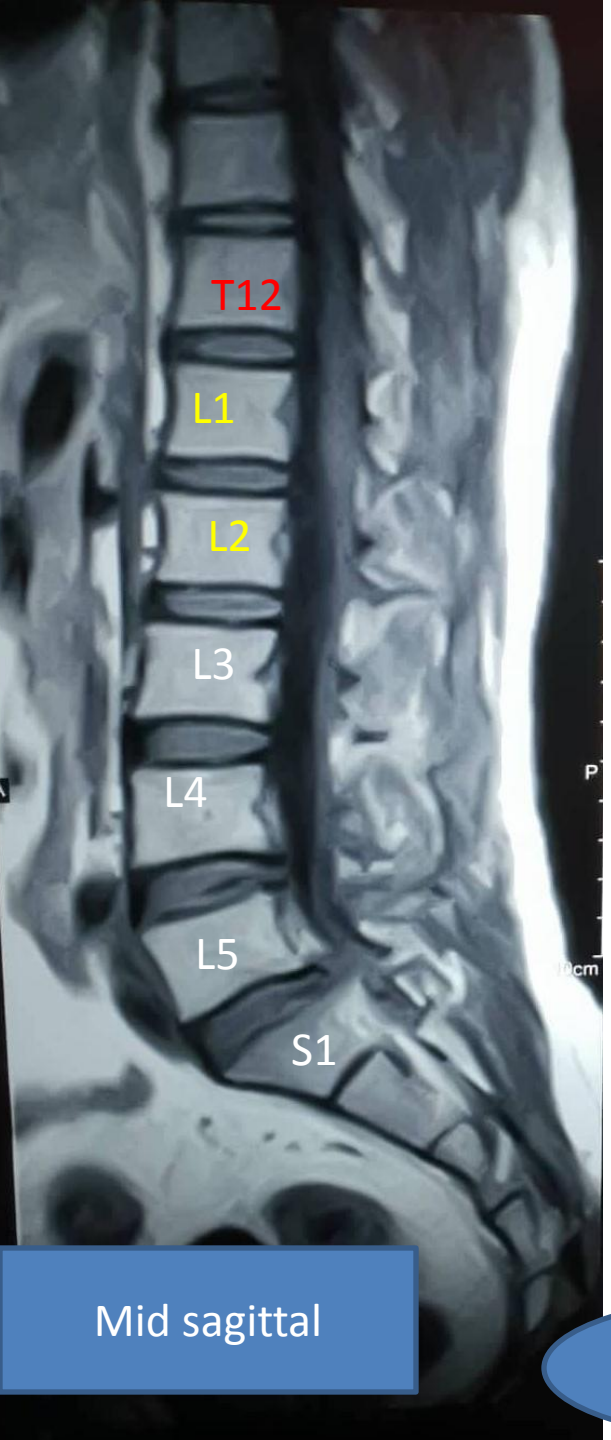
CSF

Disc bulging and posterior indentation

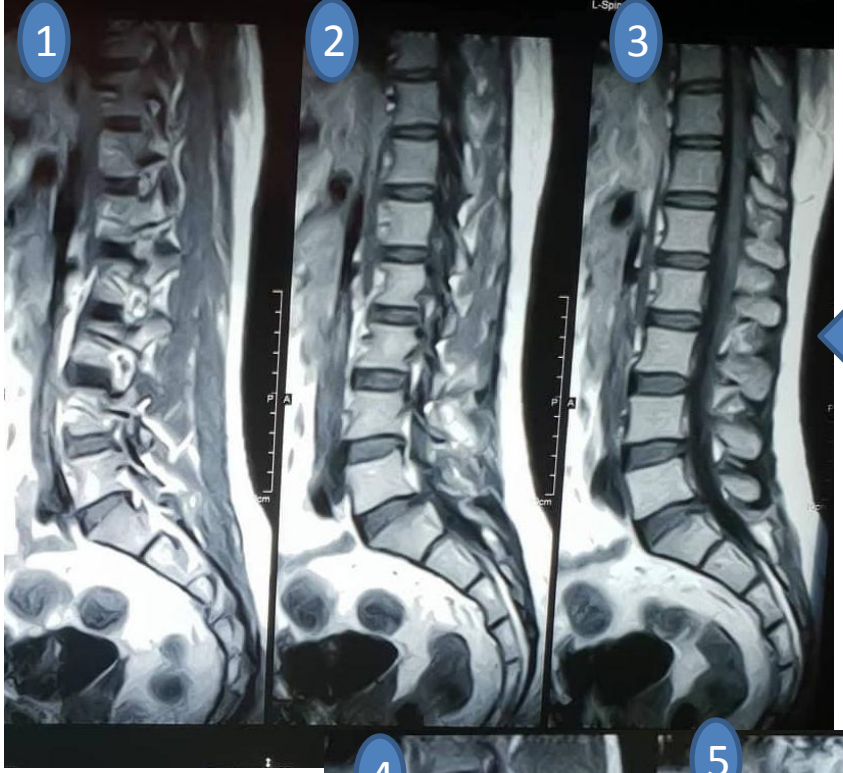

T12
L1
L2
L3
L4
L5
S1
Dr shamol
Disc bulging and posterior indentation


T12
L1
L2
L3
L4
L5
S1
Disc bulging and posterior indentation
Dr shamol

Lumber spondylosis



Mid sagittal

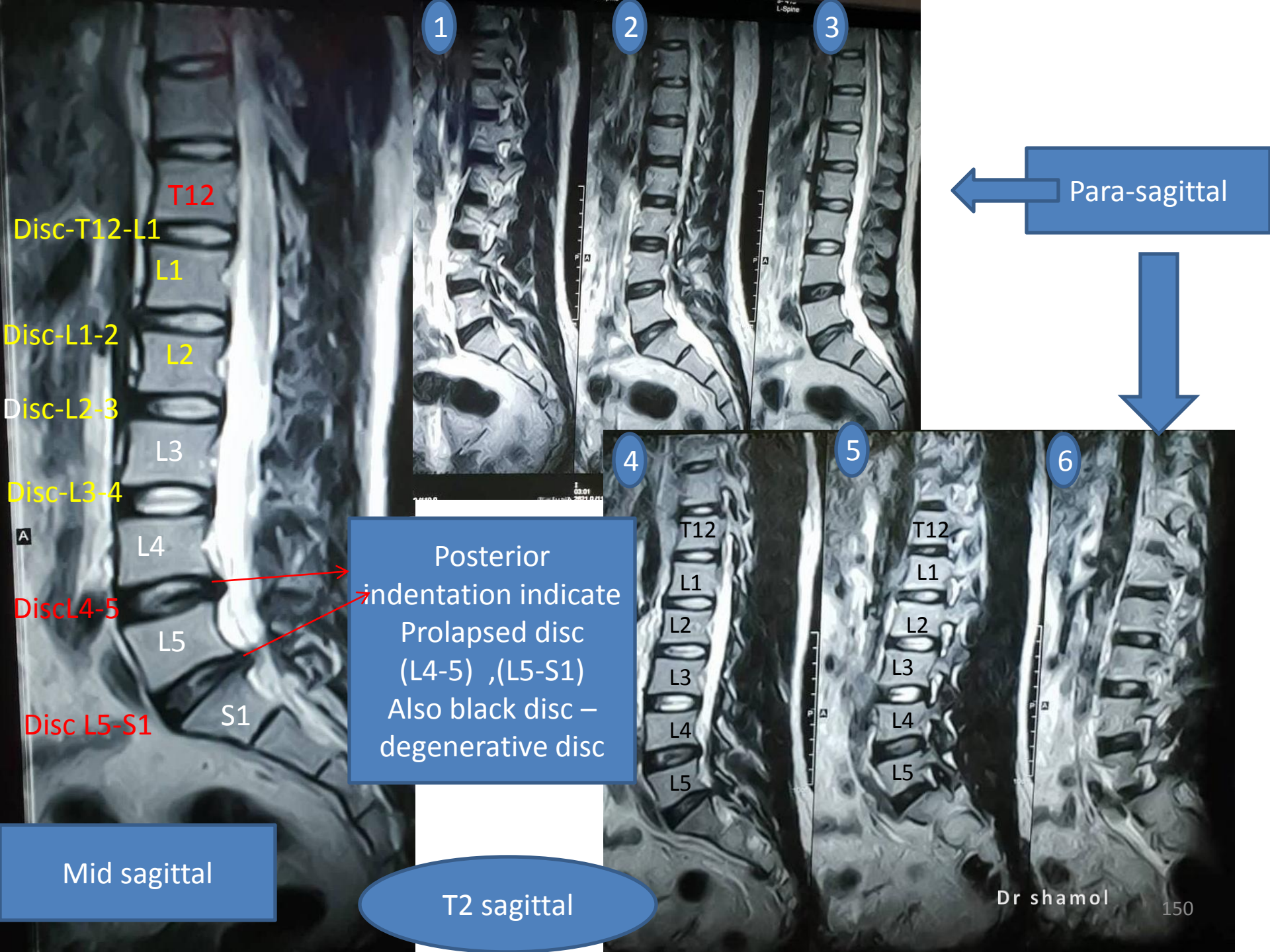


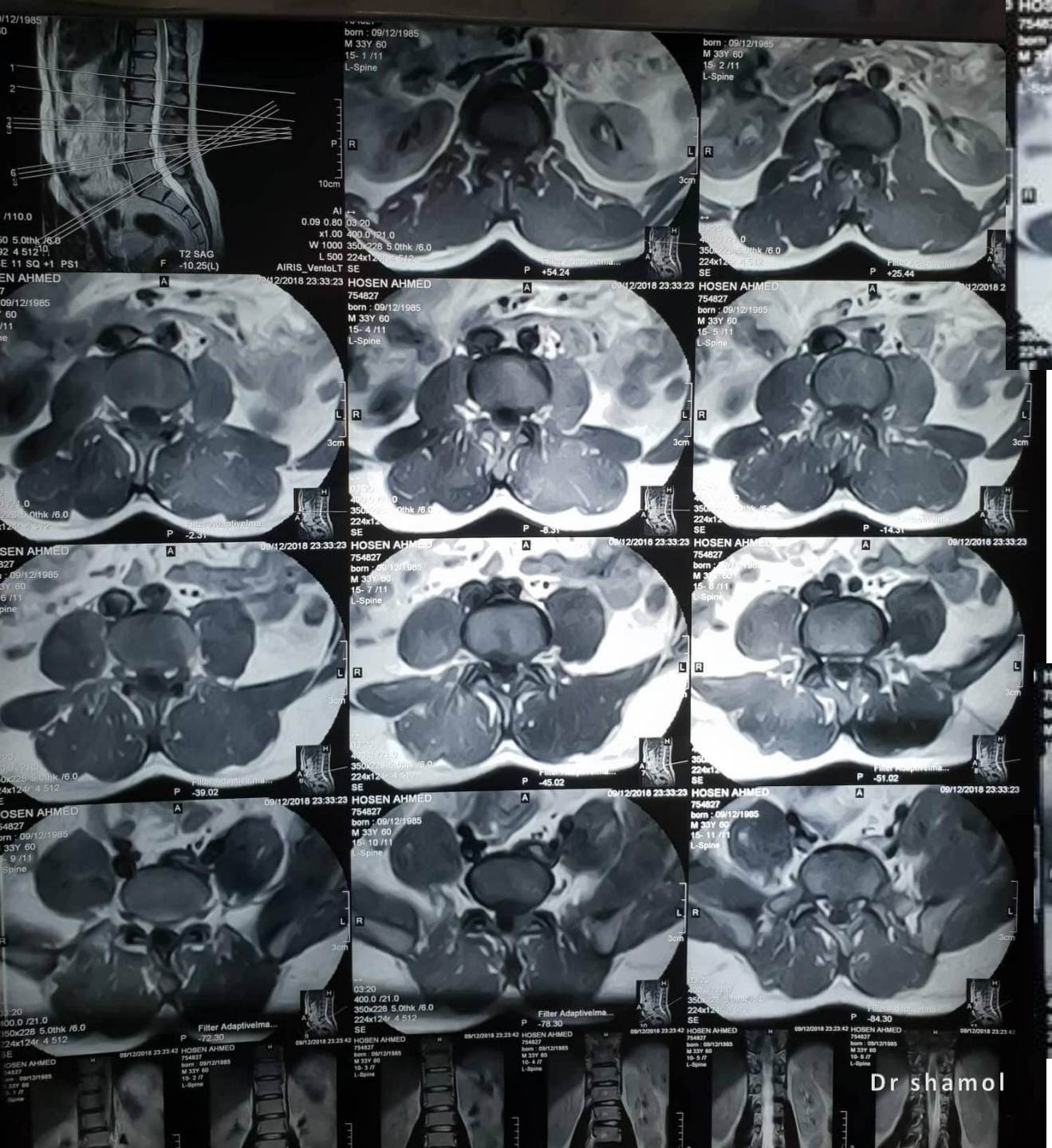
Para-sagittal

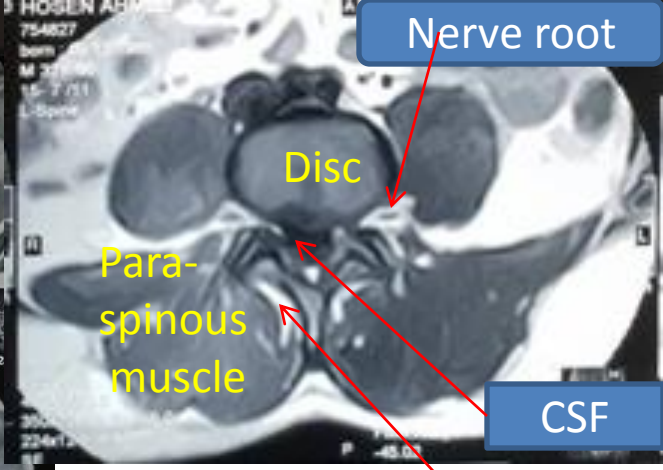


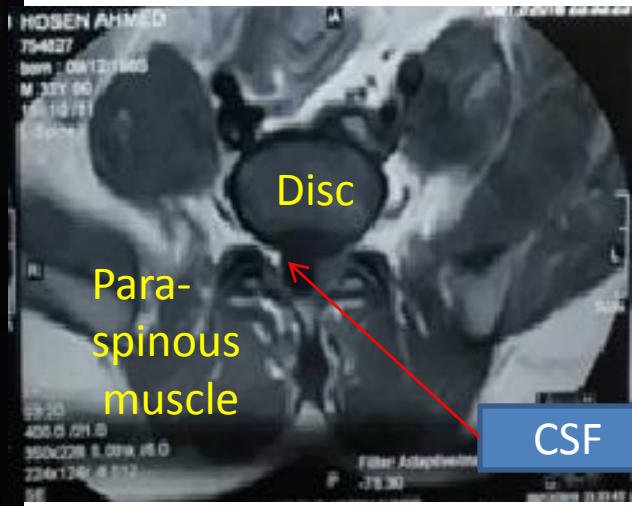
T1 sagittal

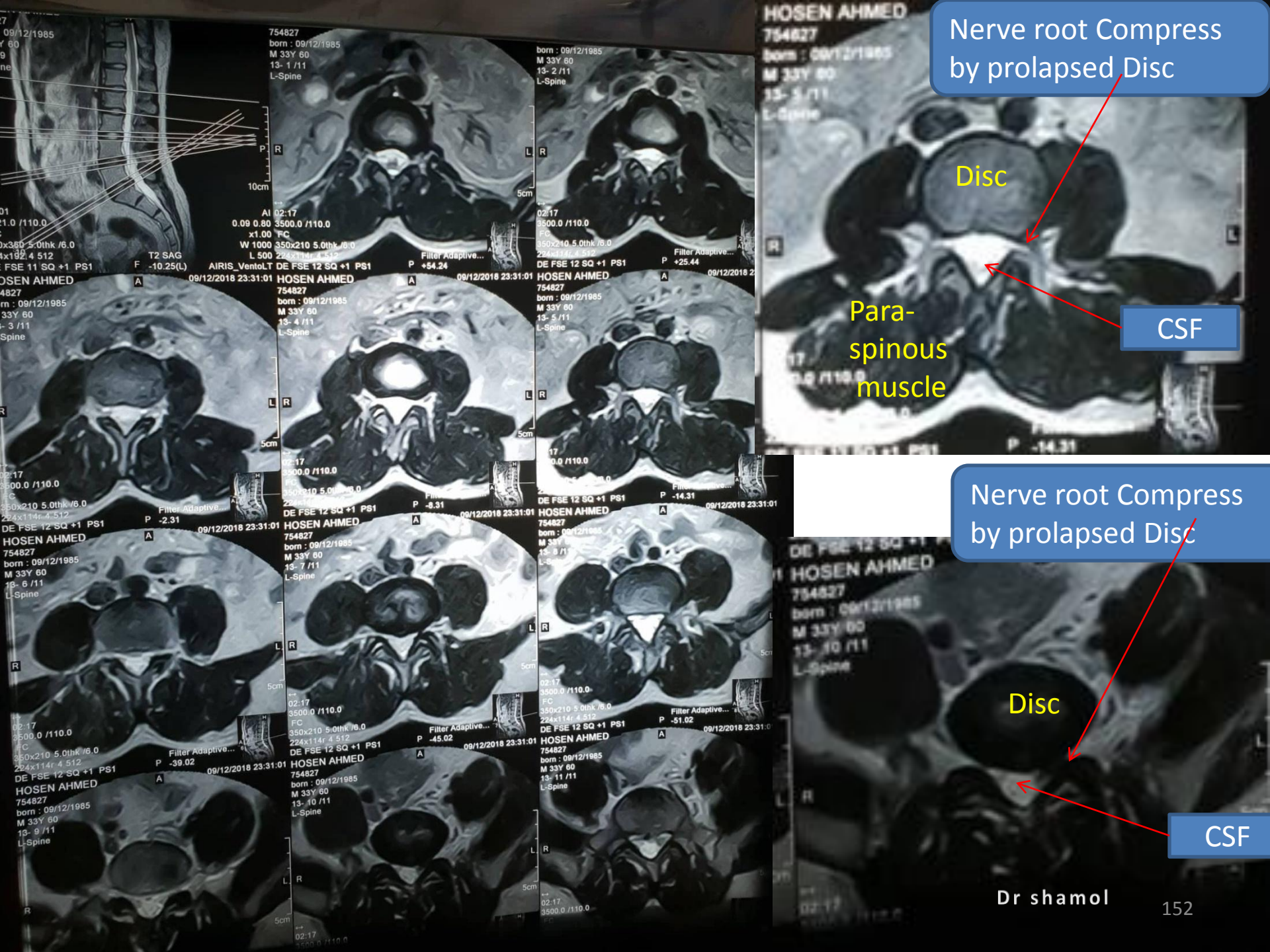
Dr shamol


T12
Disc-T12-L1
L1
Disc-L1-2
L2
Disc-L2-3
L3
Disc-L3-4
L4
DiscL4-5
L5
Disc L5-S1
S1
Mid sagittal
1
2
3
Para-sagittal
4
5
6
T12
L1
L2
L3
L4
L5
Posterior indentation indicate Prolapsed disc (L4-5) ,(L5-S1) Also black disc – degenerative disc
T2 sagittal
Dr shamol
150


Dr shamol


Nerve root
Disc
Para-
spinous
muscle
CSF
Fat


Disc
Para-
spinous
muscle
CSF


Nerve root Compress by prolapsed Disc
Disc
Para-spinous muscle
CSF
Nerve root Compress by prolapsed Disc
Disc
CSF
Dr shamol

Lumber spondylosis #3

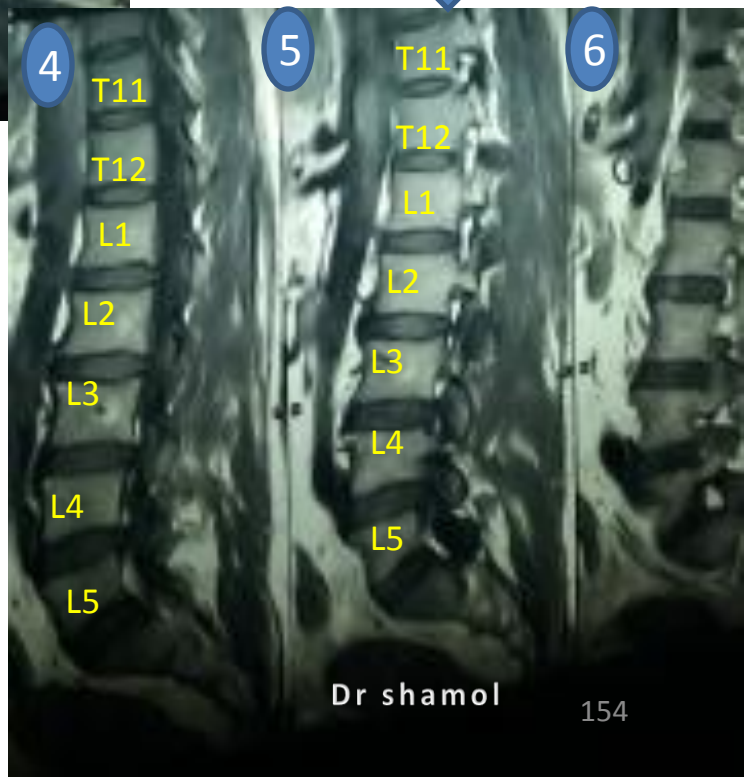


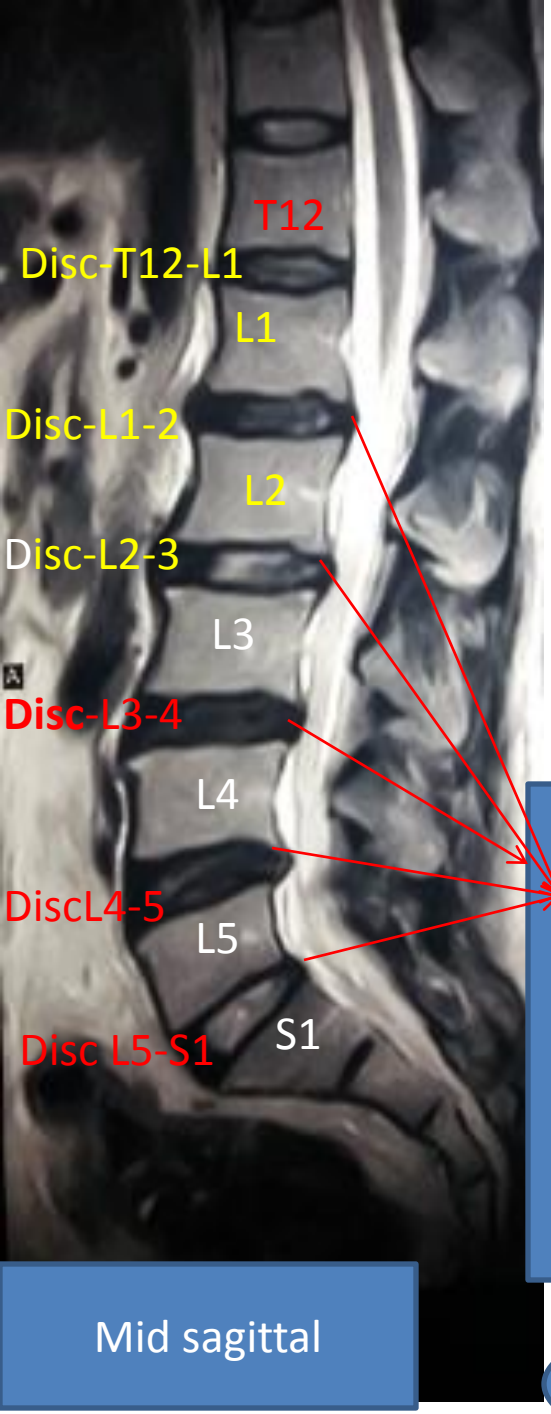
Mid sagittal



T1 sagittal

Para-sagittal



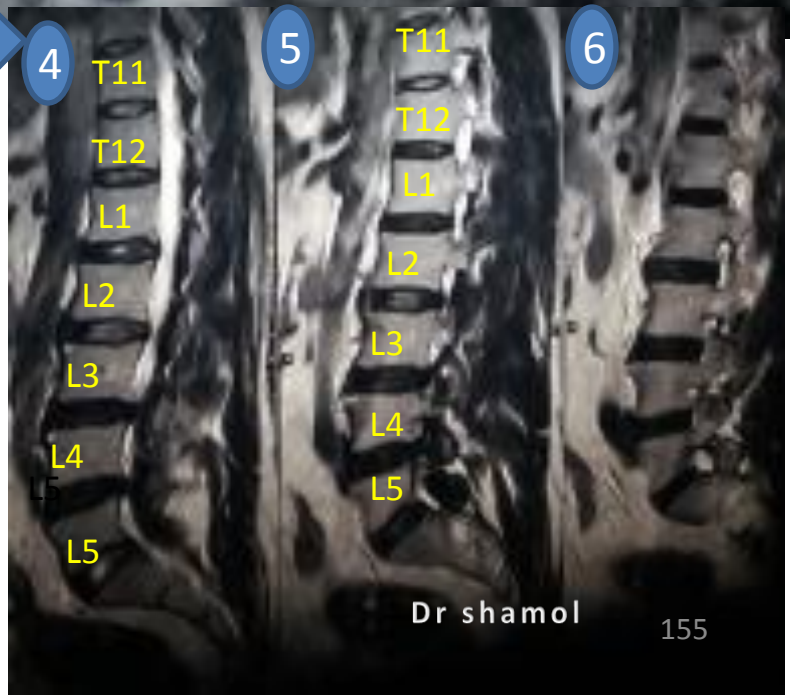


Mid sagittal

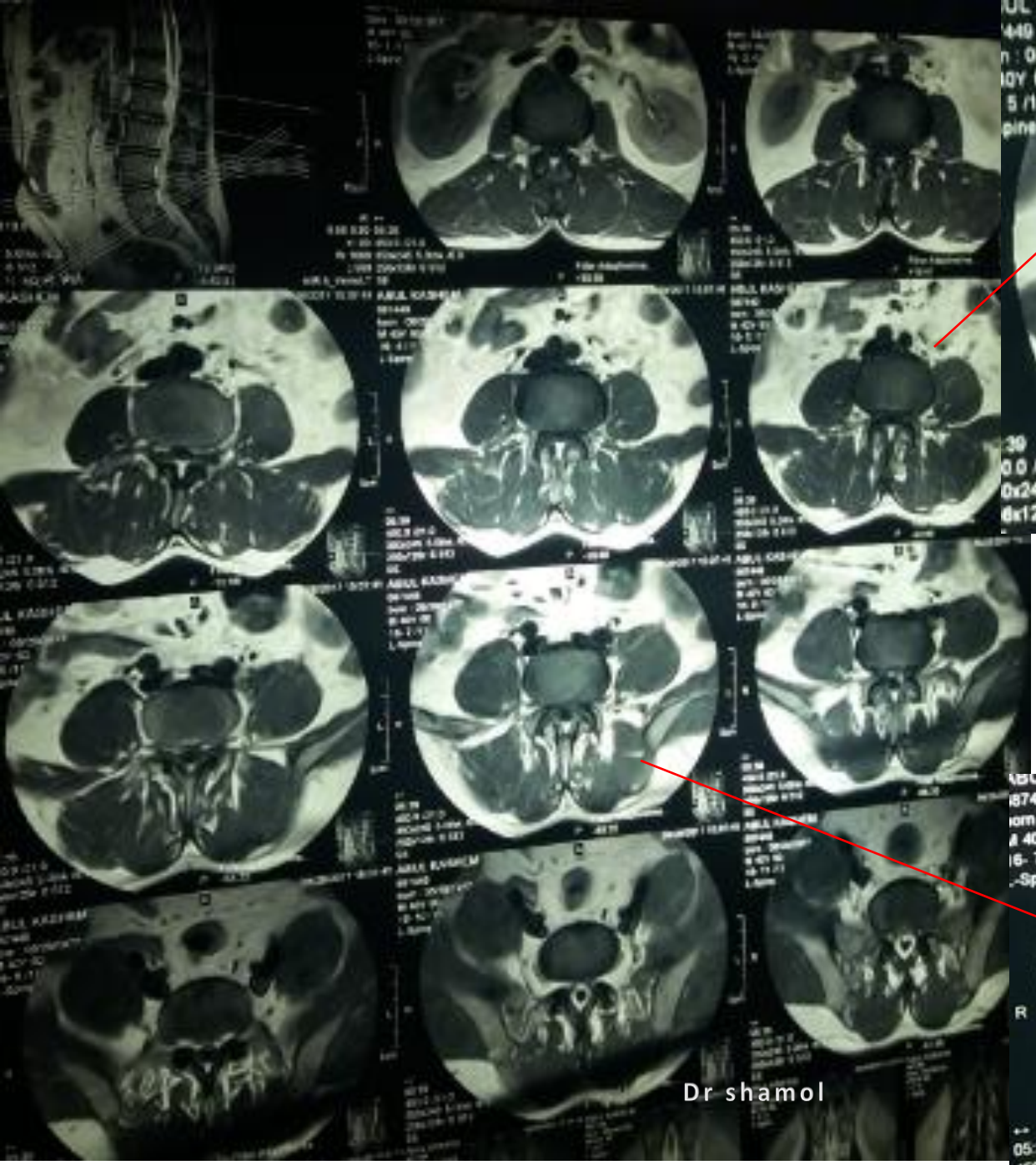
Para-sagittal

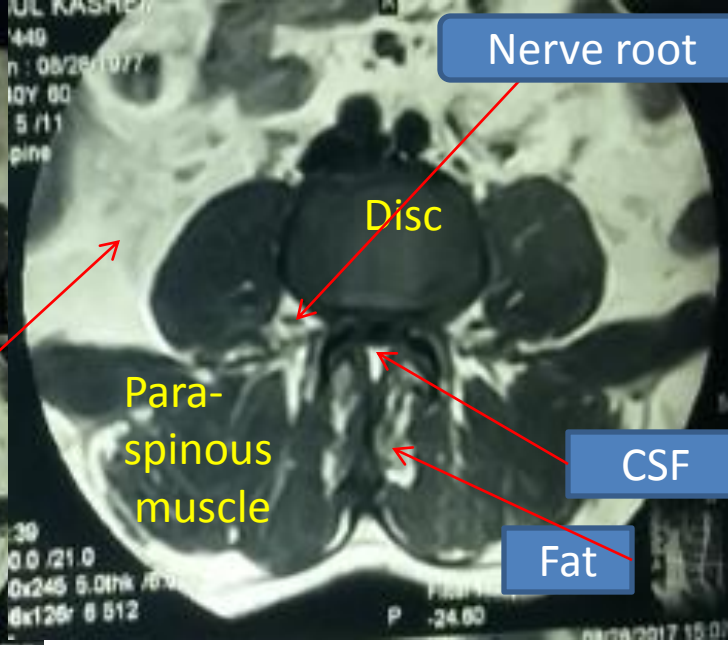


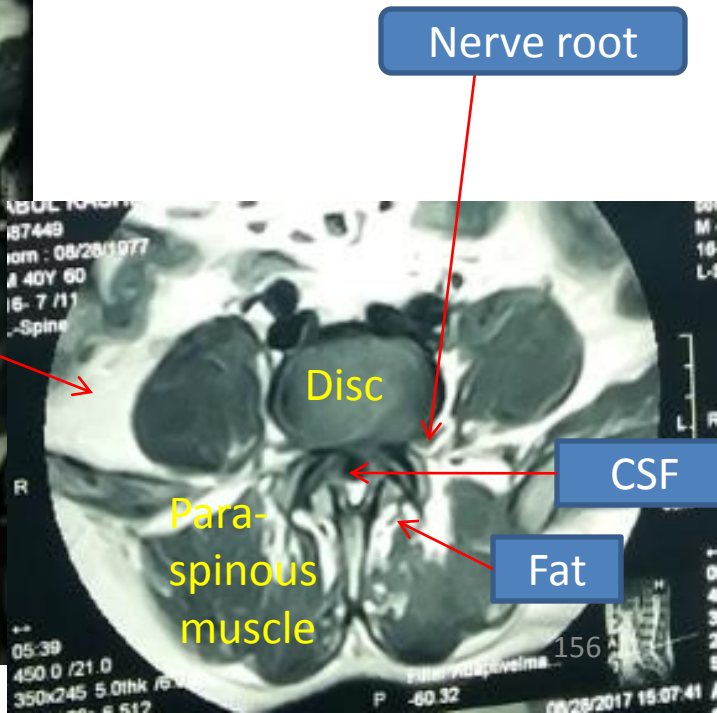
Posterior indentation indicate Prolapsed disc (L3-4) ,(L4-5) (L5-S1),(L2-3) (L1-2) Also black disc – degenerative disc

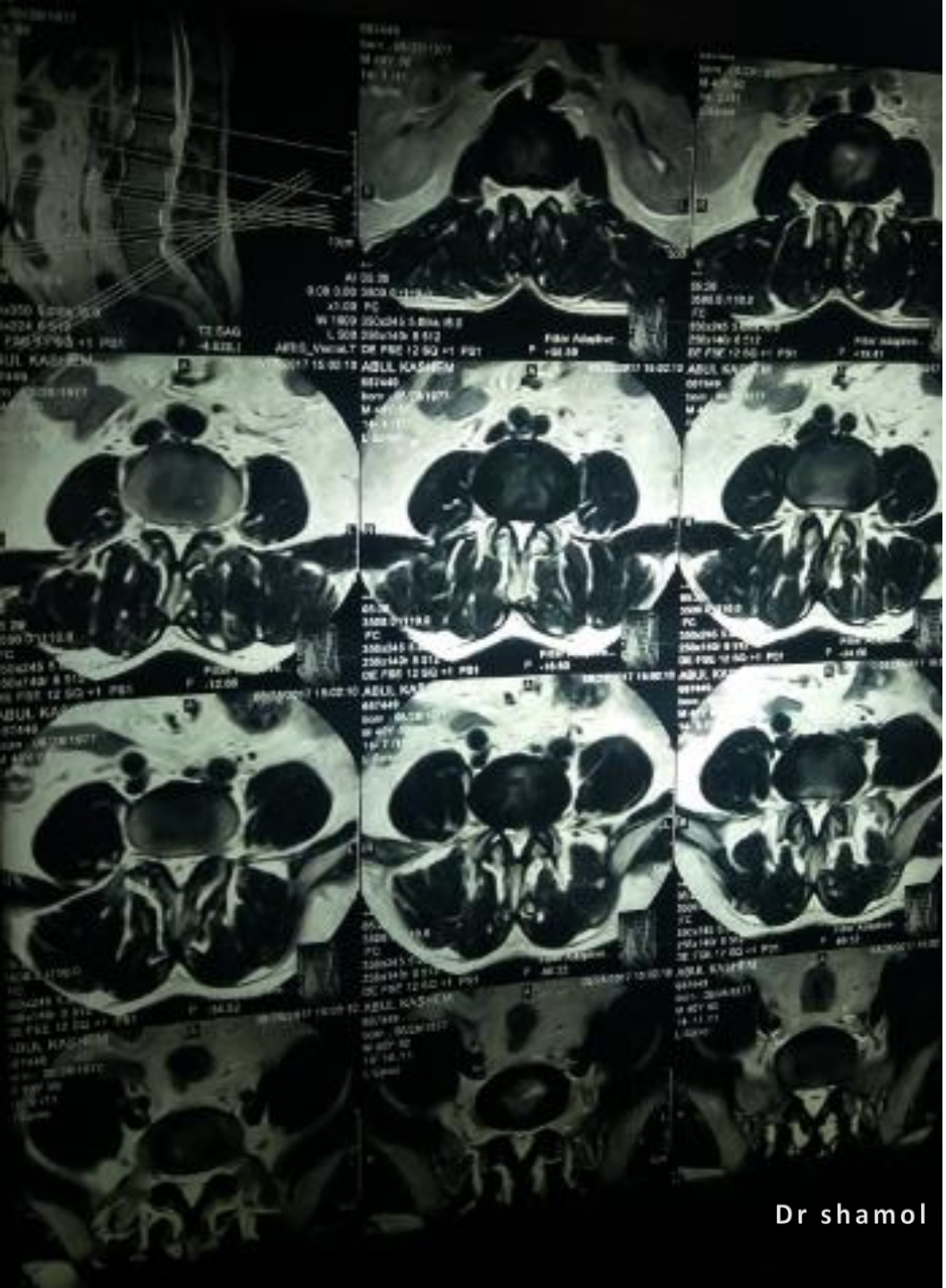


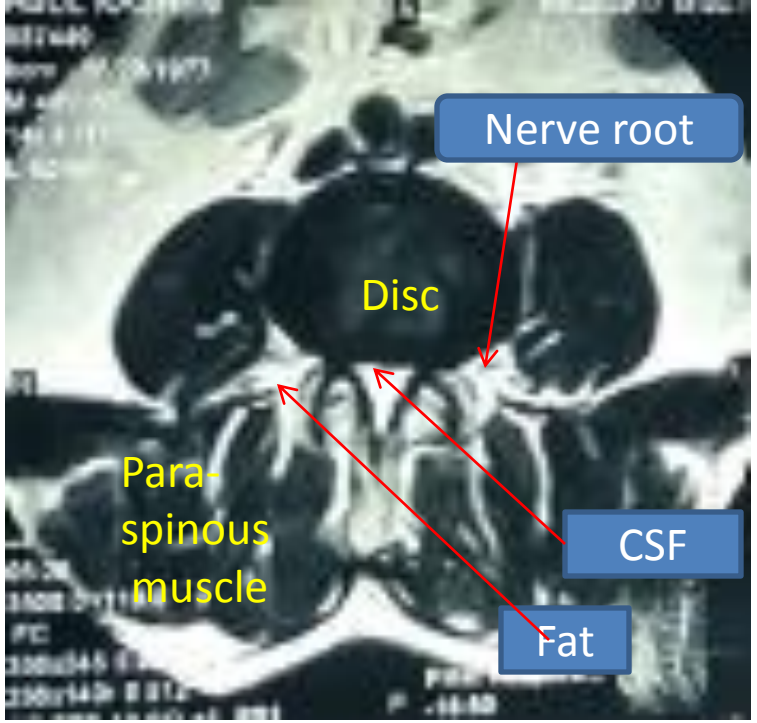
T2 sagittal

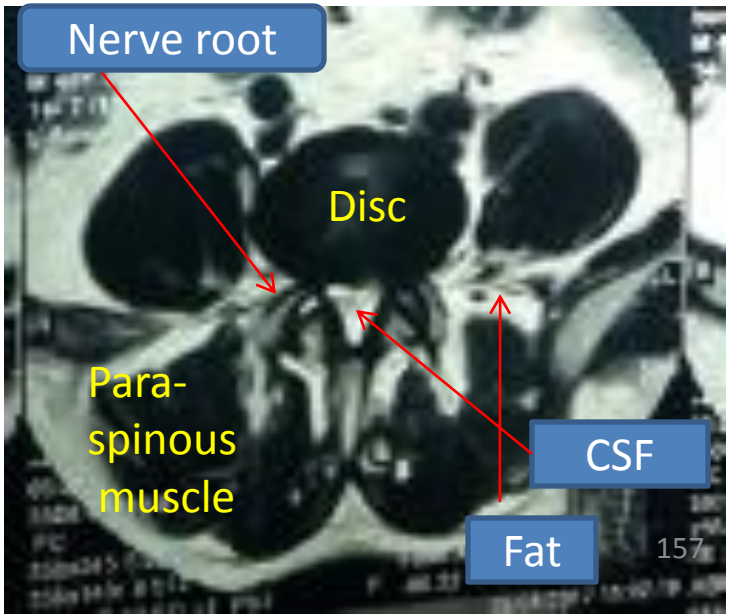

Dr shamol


Nerve root
Disc
Para-
spinous
muscle
CSF
Fat


Nerve root
Disc
CSF
Para-
spinous
muscle
Fat


Dr shamol

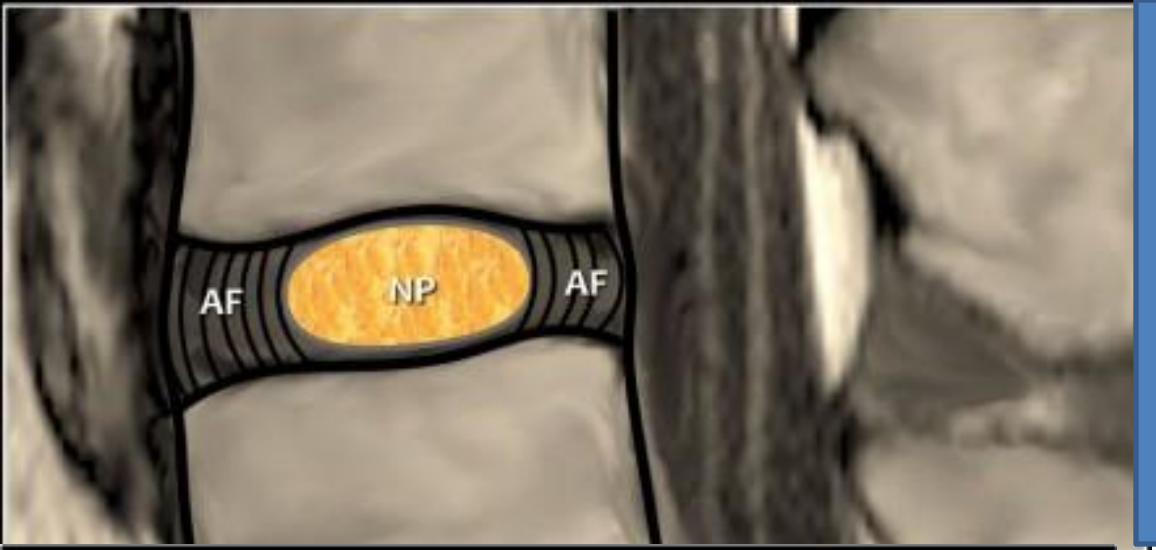

Nerve root
Disc
Para-
spinous
muscle
CSF
Fat


Nerve root
Disc
Para-
spinous
muscle
CSF
Fat

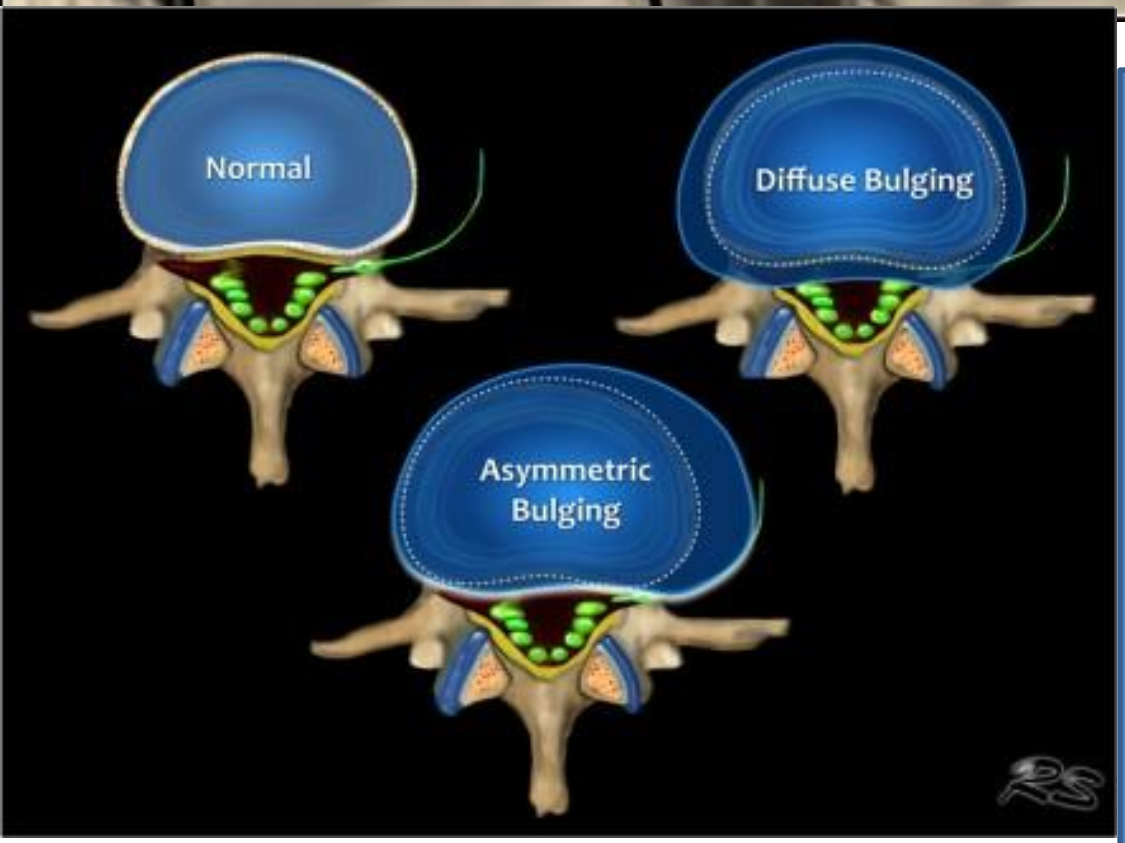
Disc herniation nomenclature

Disc herniation	refers to the displacement of intervertebral disc material beyond the normal confines of the disc but involving less than 25% of the circumference (to distinguish it from a disc bulge)	
Disc herniations can be divided into groups	protrusion	base wider than herniation confined to disc level outer annular fibres intact
	extrusion	base (a.k.a. neck) narrower than herniation 'dome' may extend above or below endplates or adjacent vertebrae
		complete annular tear with passage of nuclear material beyond disc annulus disc material can then migrate away from annulus or become sequestered
Herniations can further be classified	contained	with intact outer fibers of annulus fibrosus and posterior longitudinal ligament, or with intact posterior longitudinal ligament alone
	not contained	tear of outer fibers of annulus fibrosus and posterior longitudinal ligament

Dr shamol

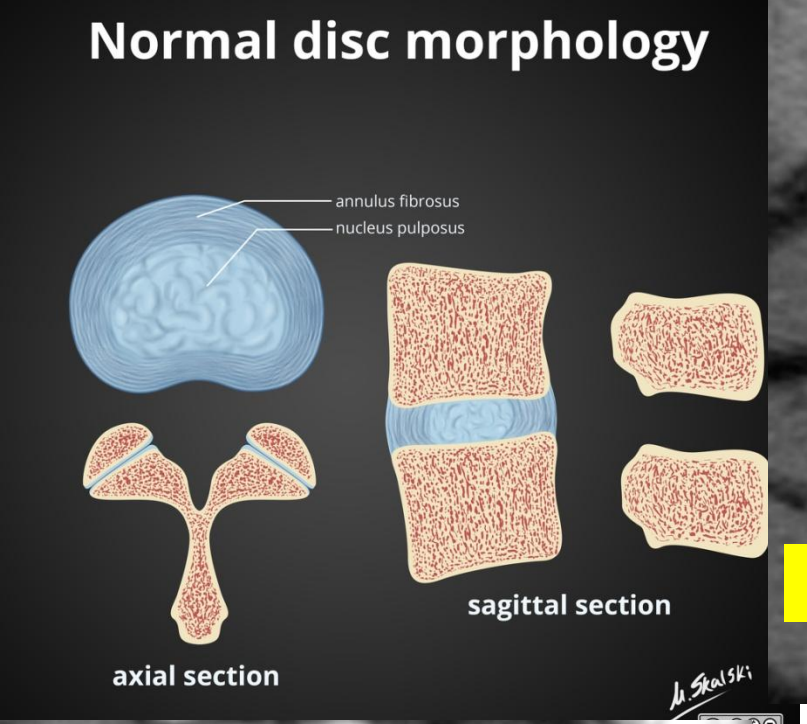


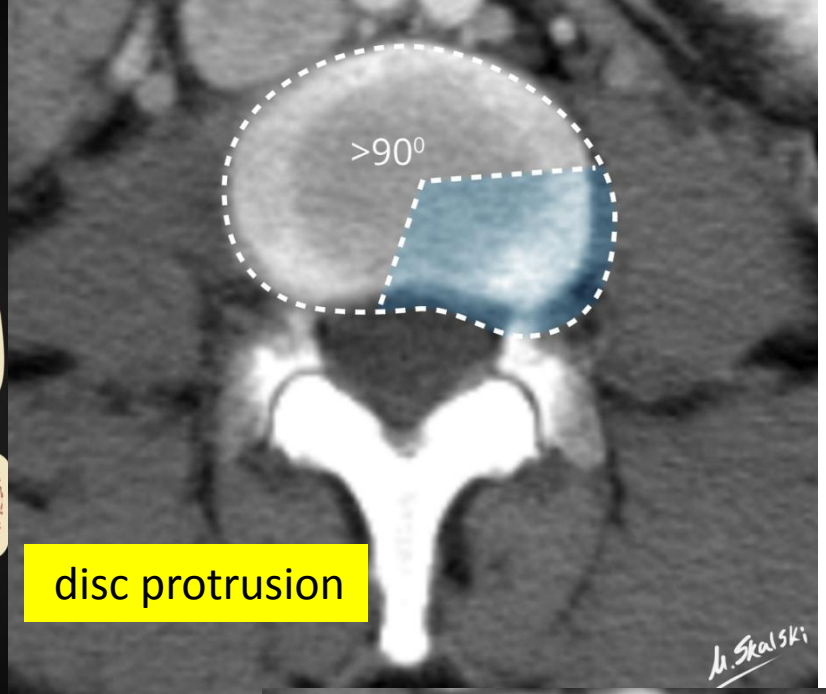
Disc is composed of soft nucleus pulposus (NP) surrounded by strong annulus fibrosus (AF)

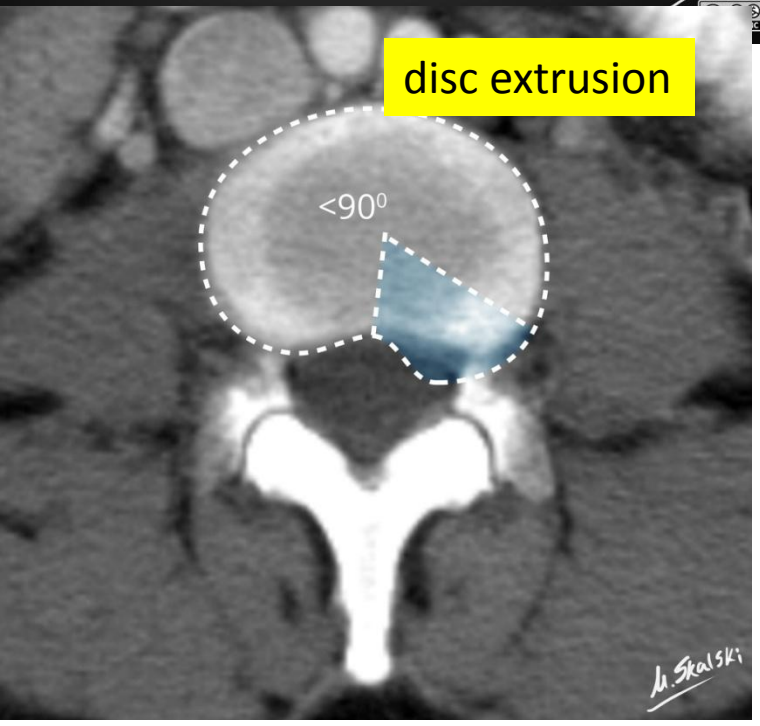


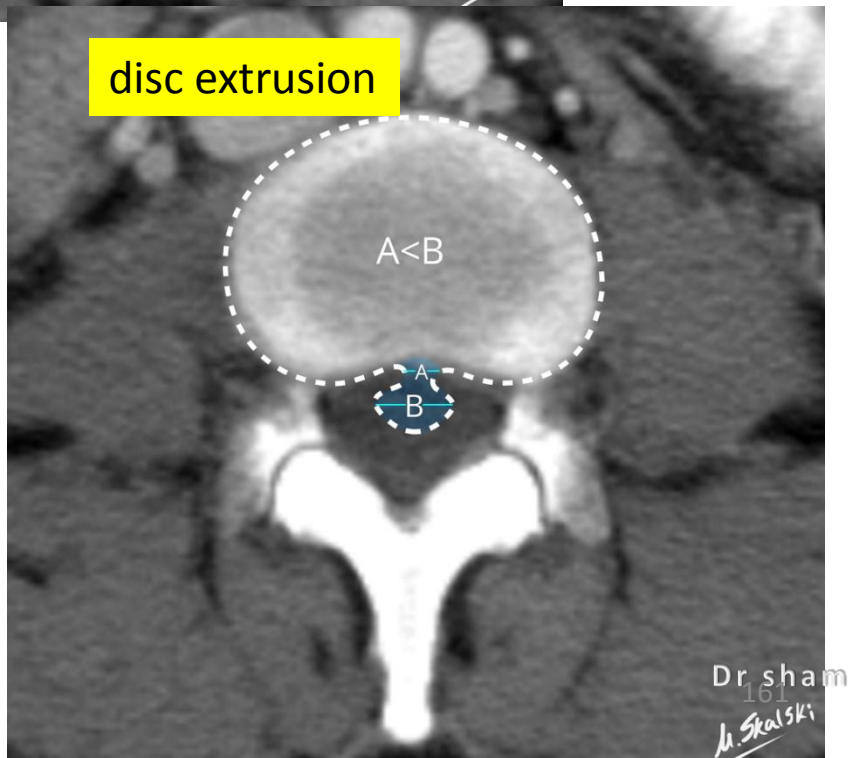
❖The presence of disc tissue extending beyond the edges of the ring apophyses, throughout the circumference of the disc, is called ''bulging'' and is not considered a form of herniation.It is the result of tears in the annulus fibrosus.

❖Asymmetric bulging of disc tissue greater than 25% of the disc circumference is often seen as an adaptation to adjacent deformity.


Normal disc morphology
annulus fibrosus
nucleus pulposus
axial section
sagittal section


>90⁰
disc protrusion


<90⁰
disc extrusion


A<B
A
B
disc extrusion

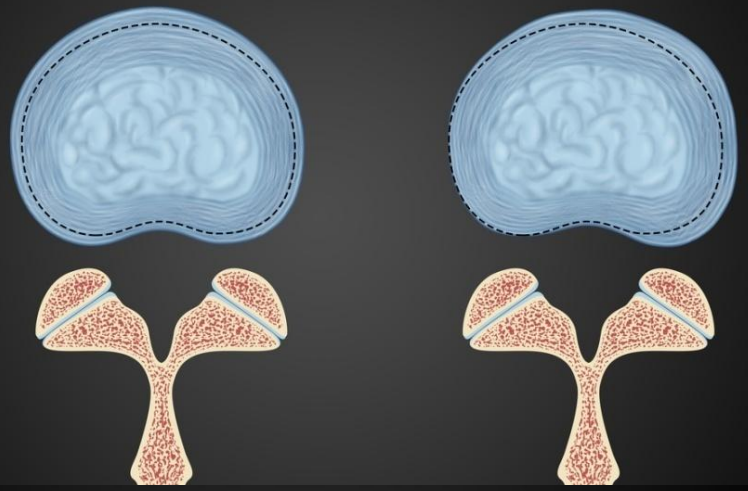
Dr shamol

Disc bulge

involves >25% of disc circumference

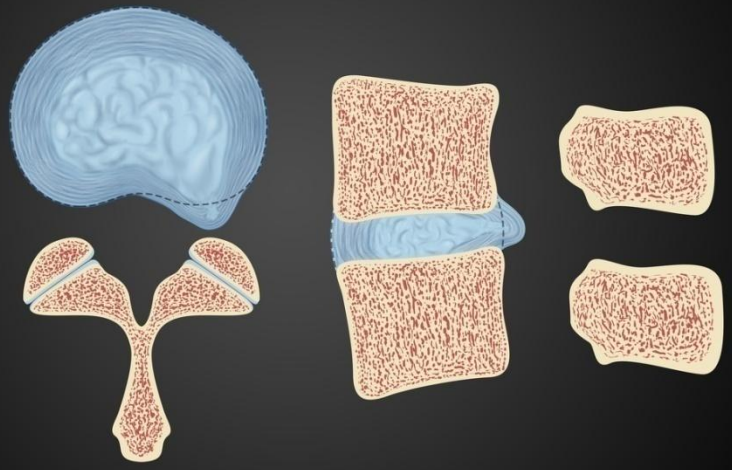
circumferential

asymmetric



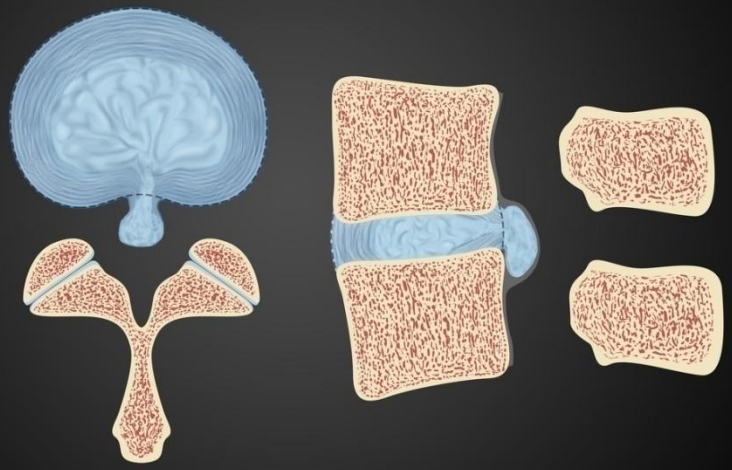
Disc protrusion

<25% of disc circumference, base wider than herniation



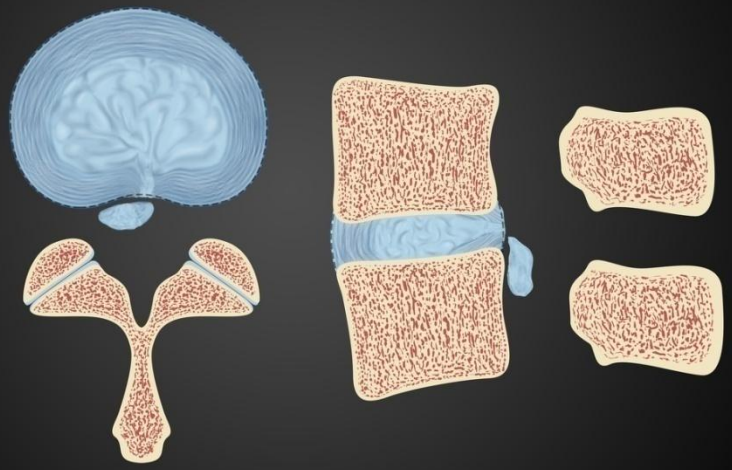
Disc extrusion

<25% of disc circumference, base narrower than herniation

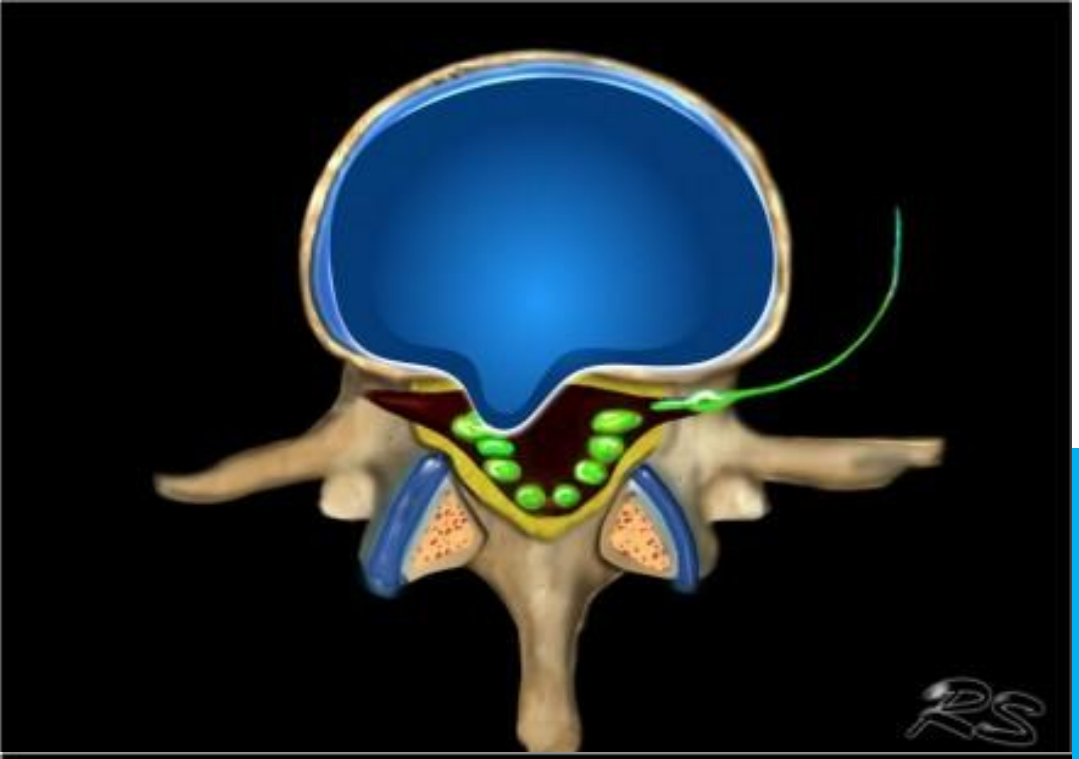


Disc sequestration

free fragment of disc material with no connection to disc

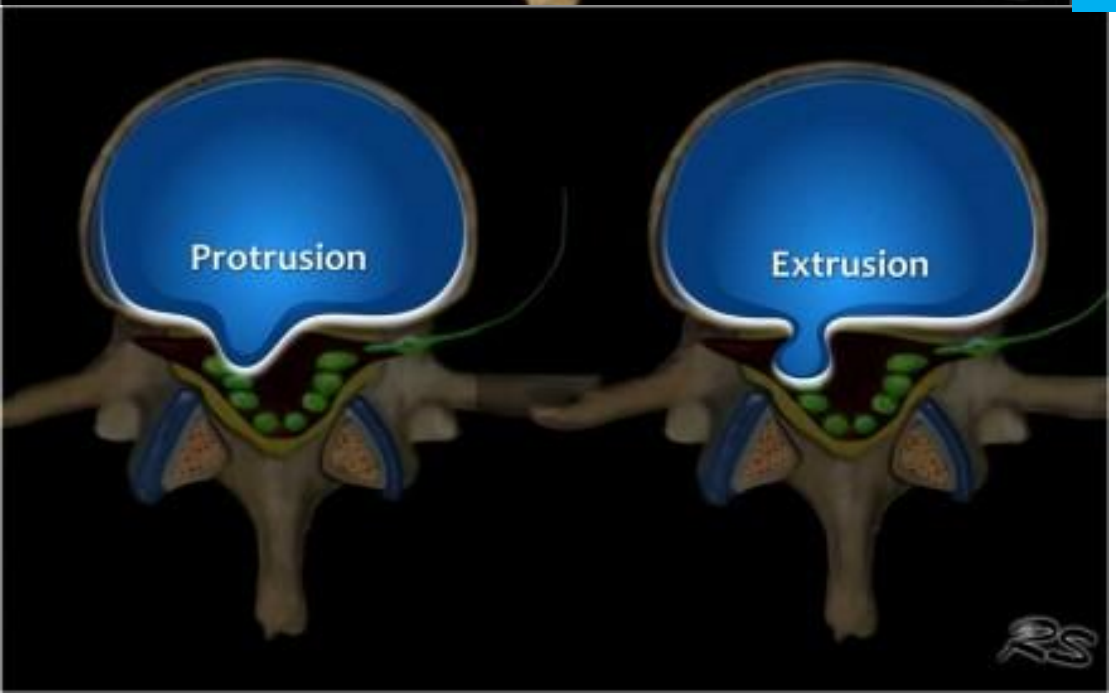


Dr sharmol



Disc herniation is defined as a focal displacement of disc material (< 25% of the disc circumference) beyond the limits of the intervertebral disc space. A herniated disc can be contained (covered by outer annulus fibrosus) or uncontained.

The margins of the contained disc protrusions are smooth on imaging. Disc herniations are *uncontained* when there is no such covering

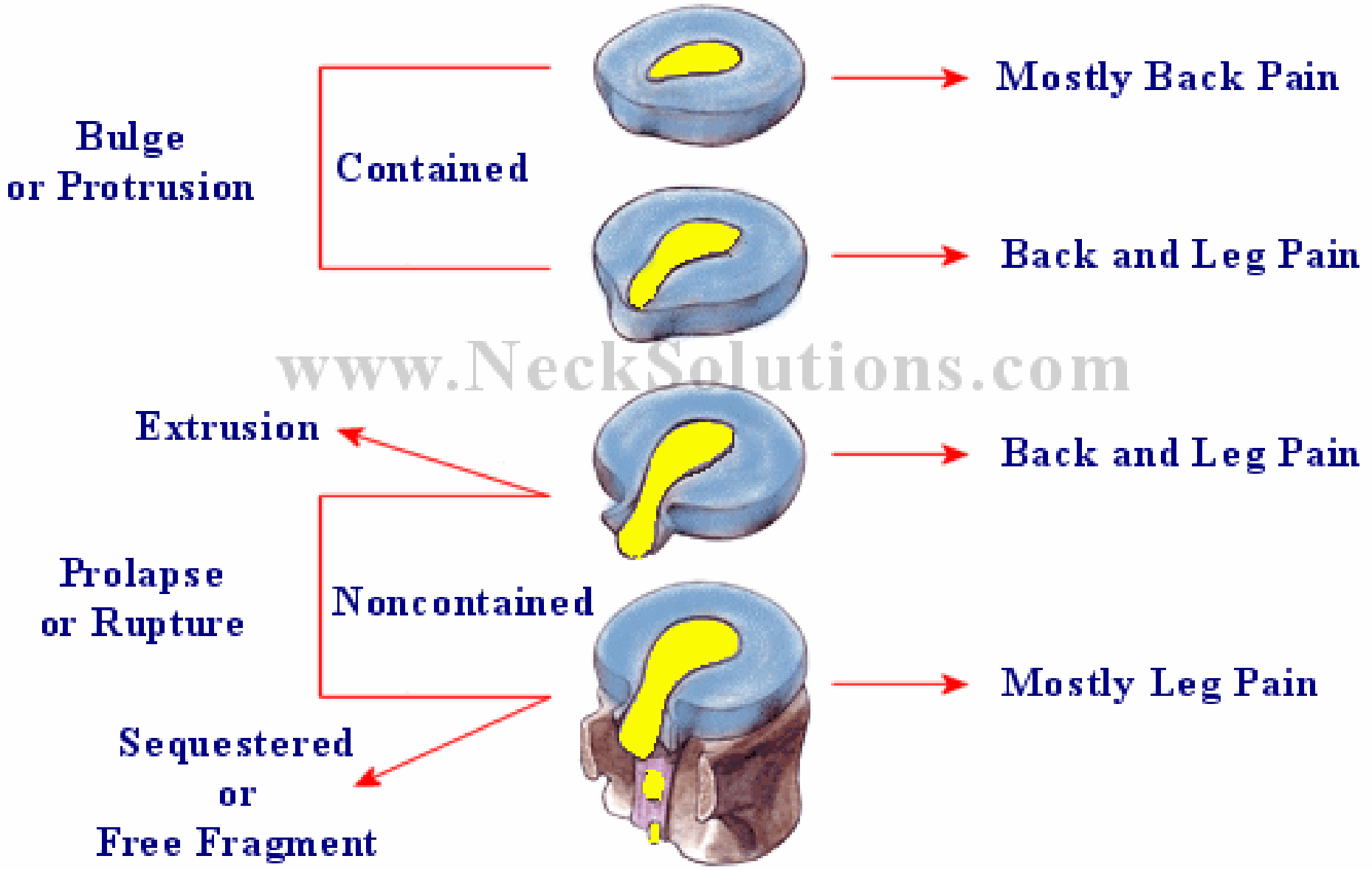


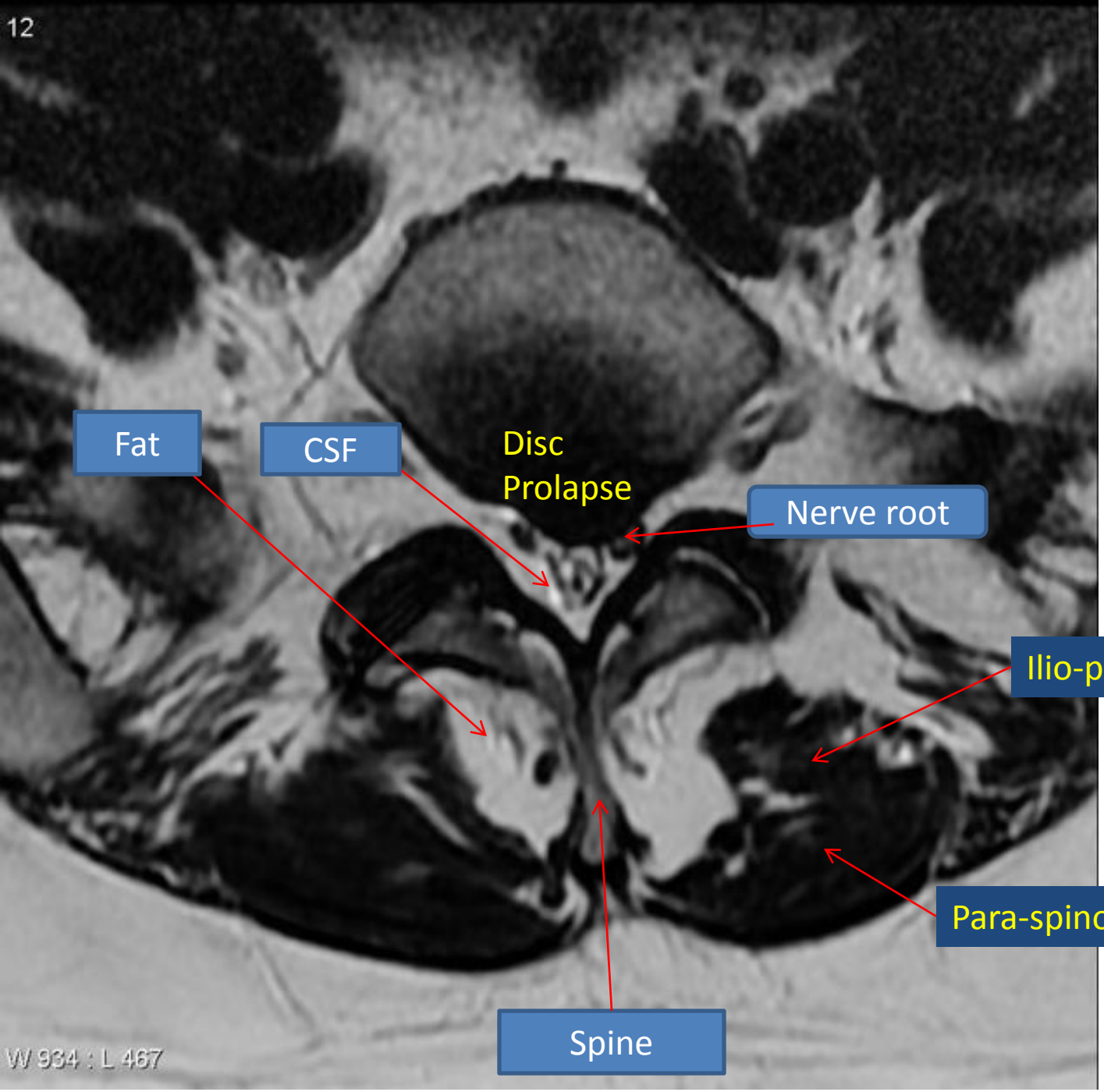
Protrusion indicates that the distance between the edges of the disc herniation is less than the distance between the edges of the base.

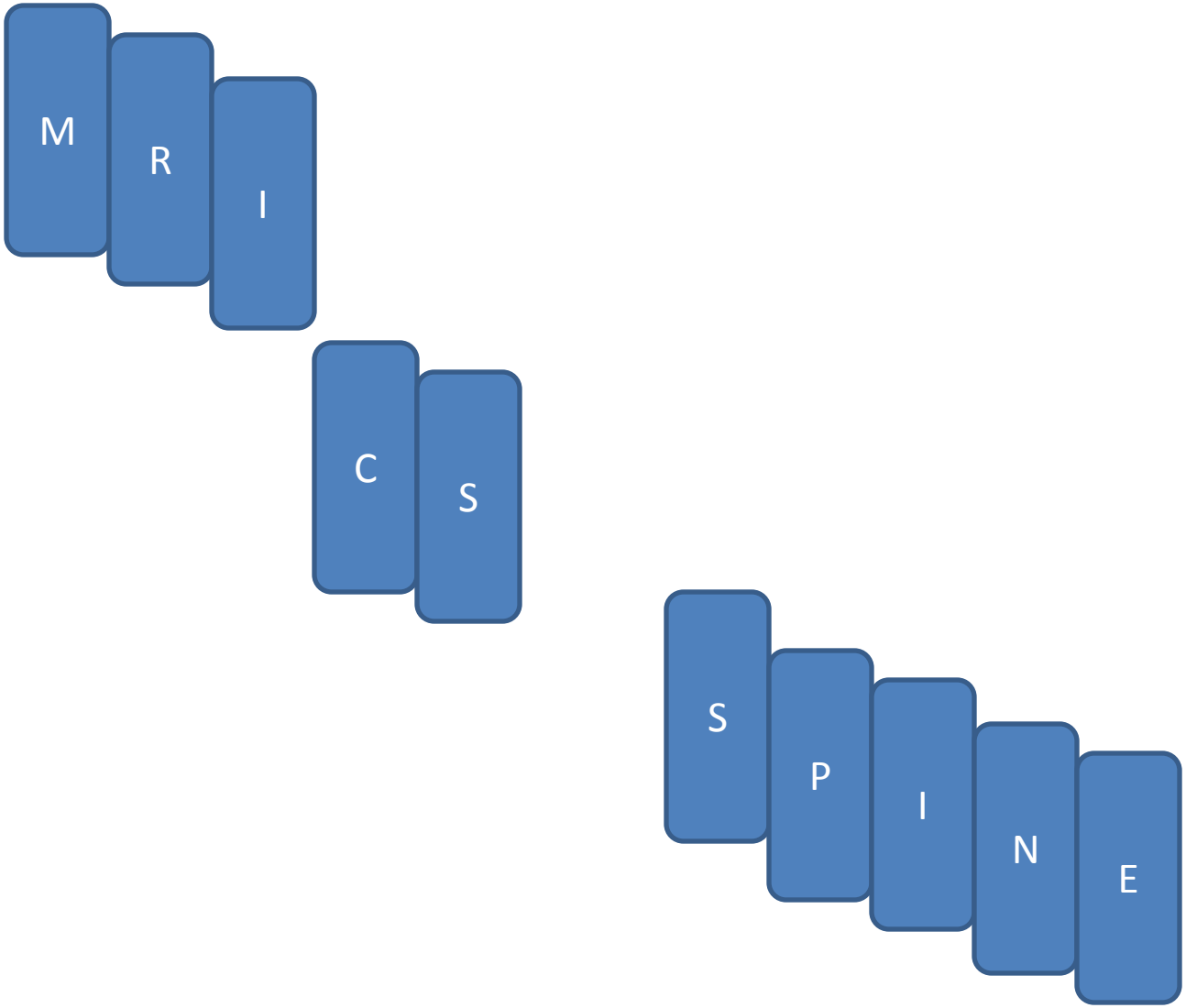
Extrusion is present when the distance between the edges of the disc material is greater than the distance at the base.

Extrusion is associated with a defect in the annulus fibrosus and are usually noncontained.

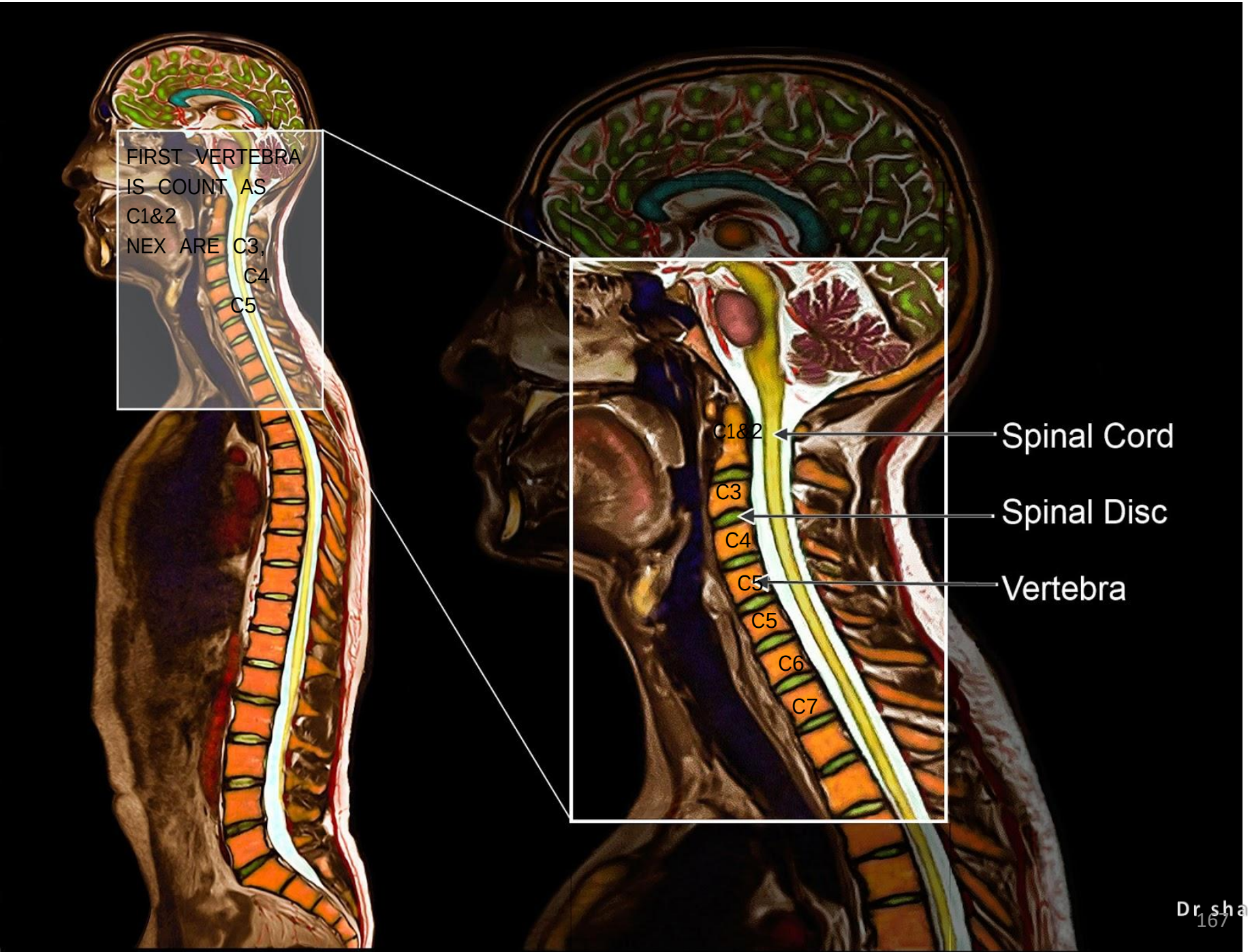
Types of Disc Herniation

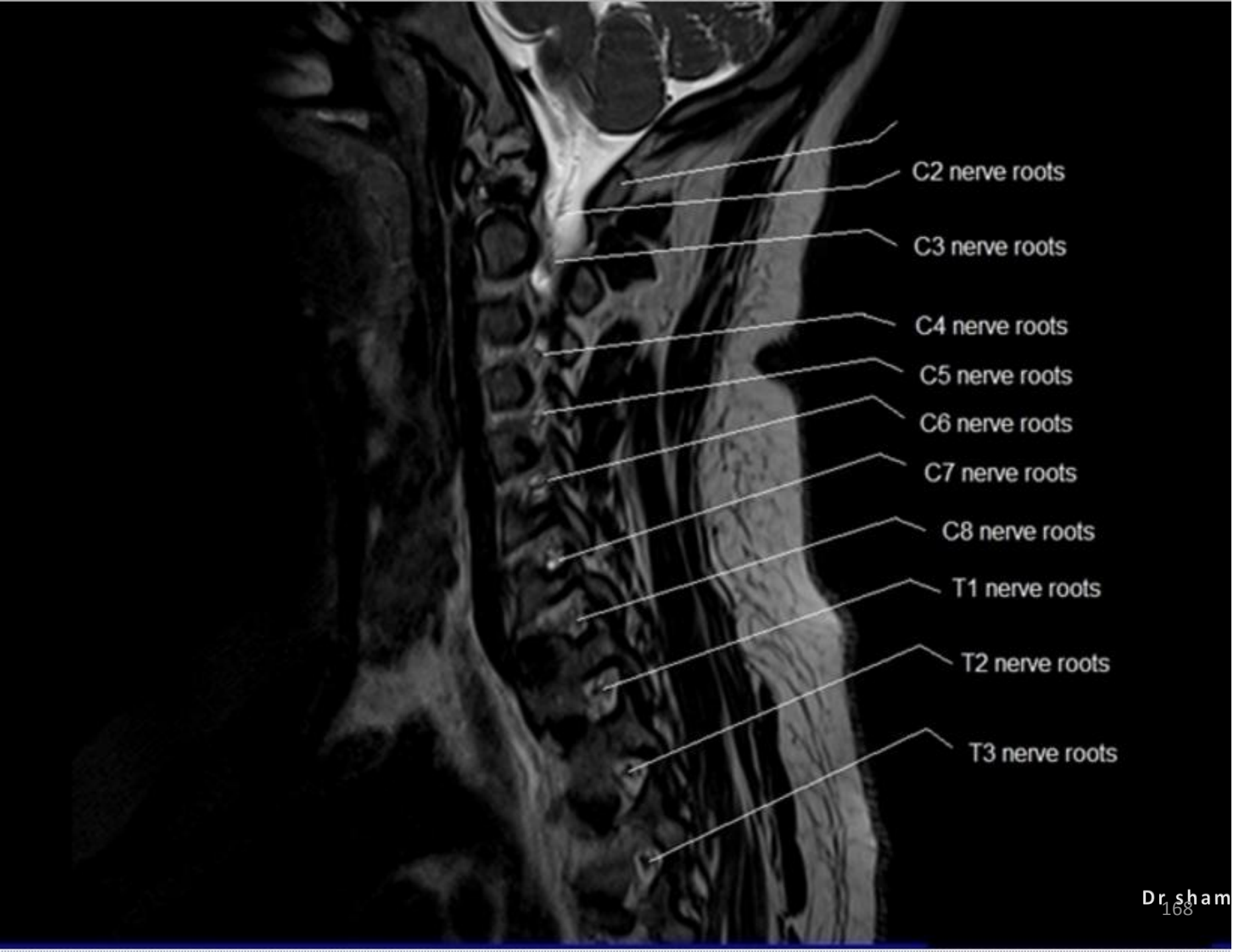


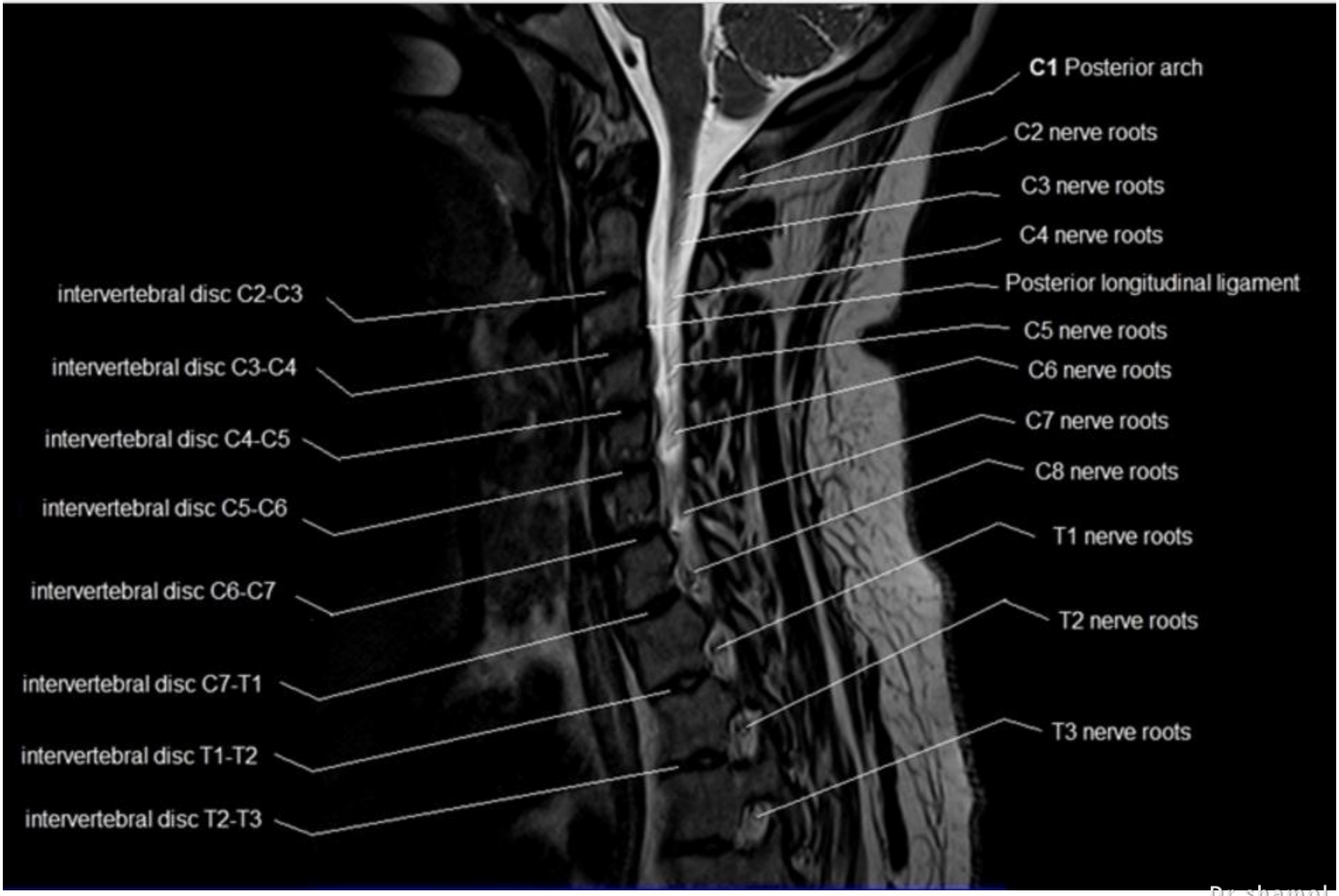

12
Fat
CSF
Disc
Prolapse
Nerve root
Ilio-psoas
Para-spinous muscle
Spine
W 934 : L 467

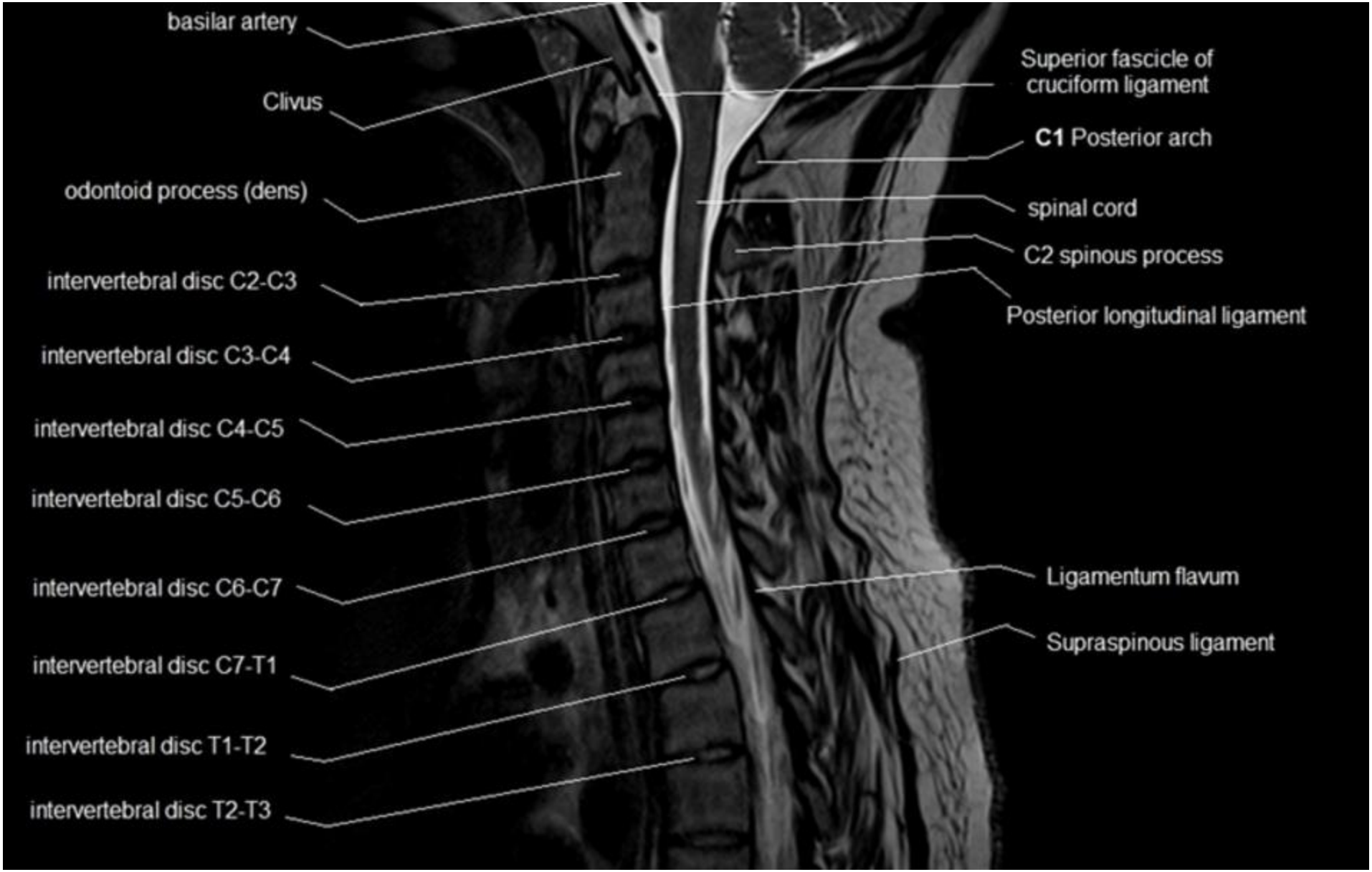


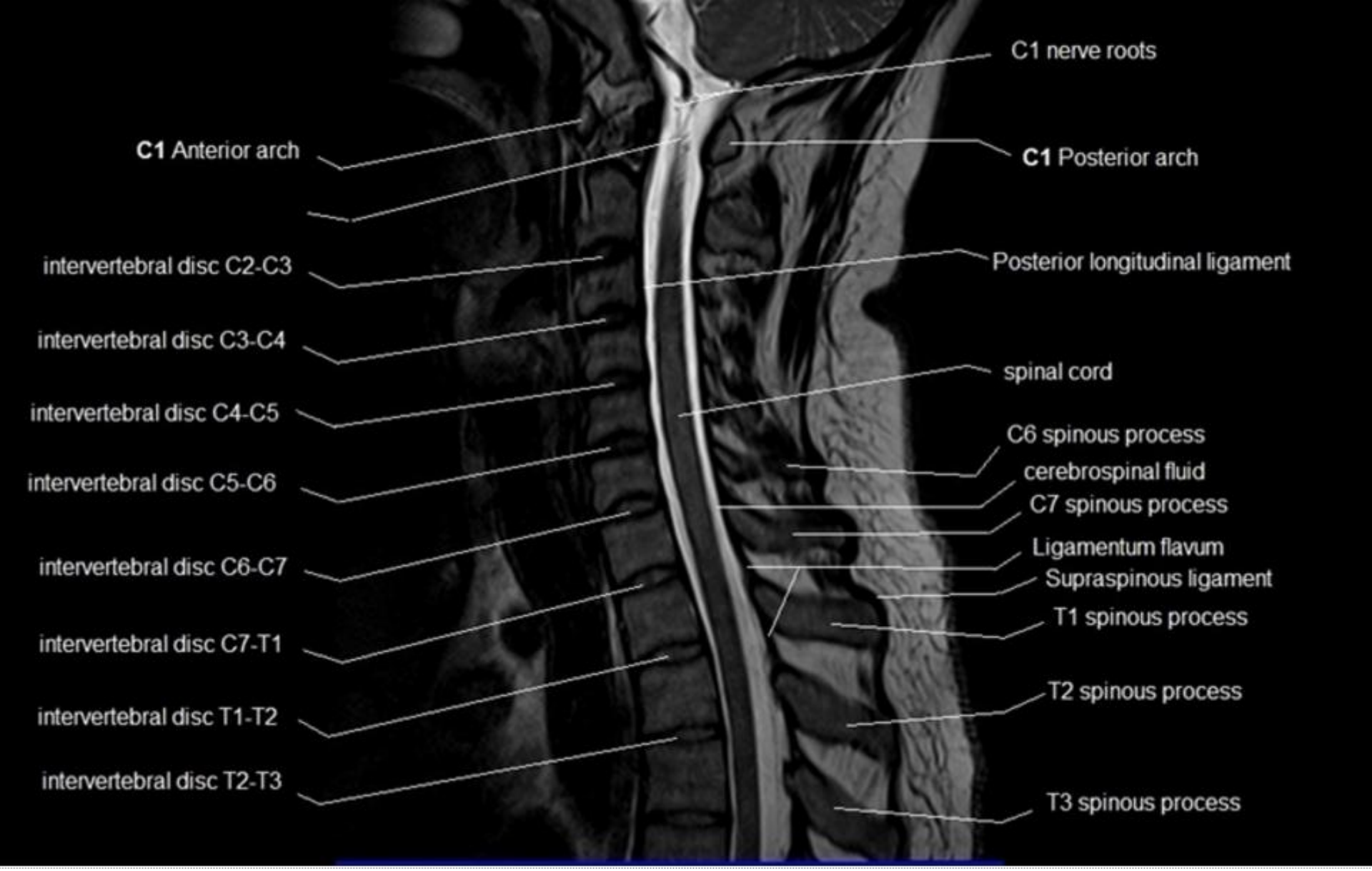
Dr shamol

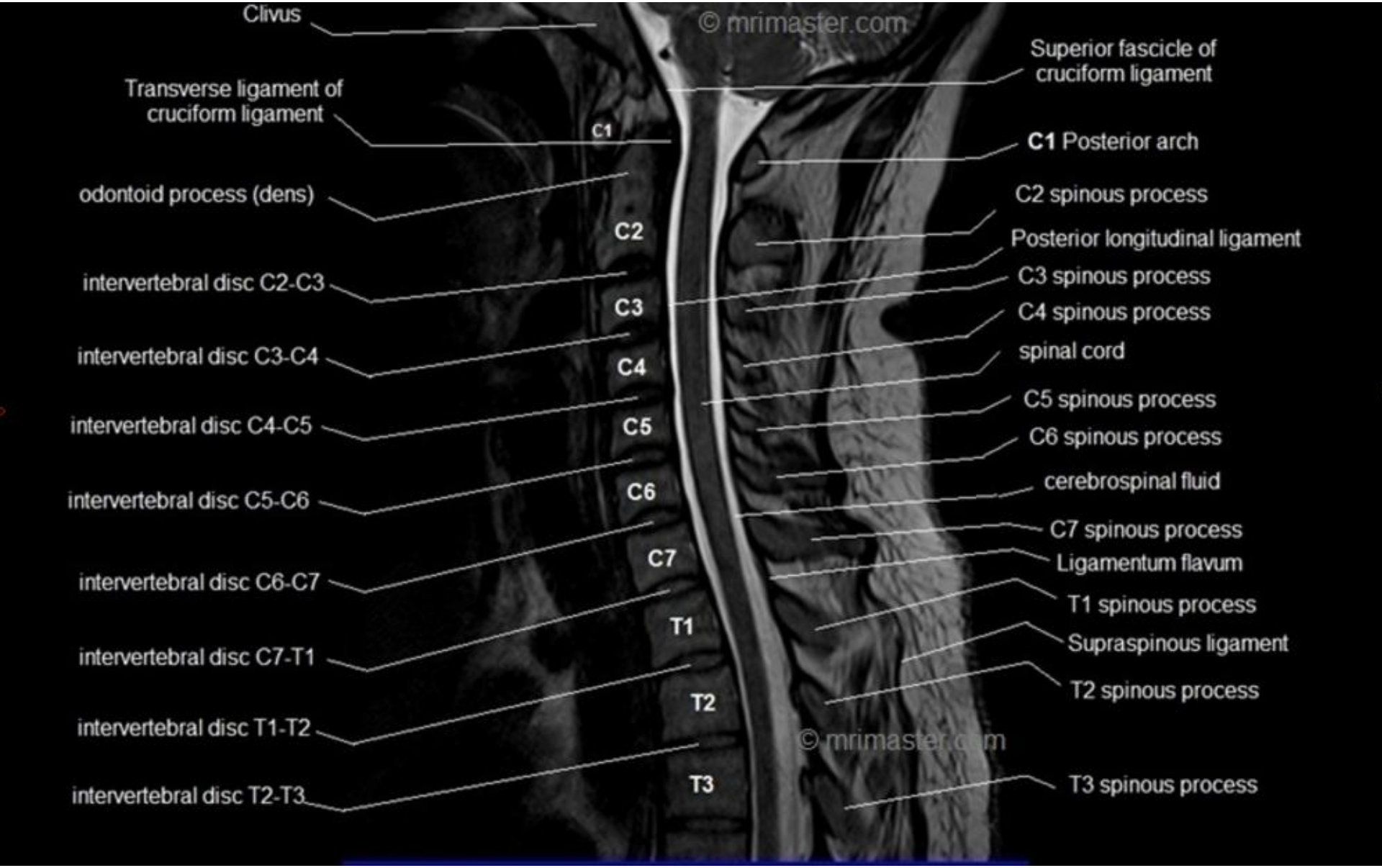

FIRST VERTEBRA
IS COUNT AS
C1&2
NEX ARE C3,
C4
C5
C1&2
C3
C4
C5
C5
C6
C7
Spinal Cord
Spinal Disc
Vertebra


C2 nerve roots
C3 nerve roots
C4 nerve roots
C5 nerve roots
C6 nerve roots
C7 nerve roots
C8 nerve roots
T1 nerve roots
T2 nerve roots
T3 nerve roots

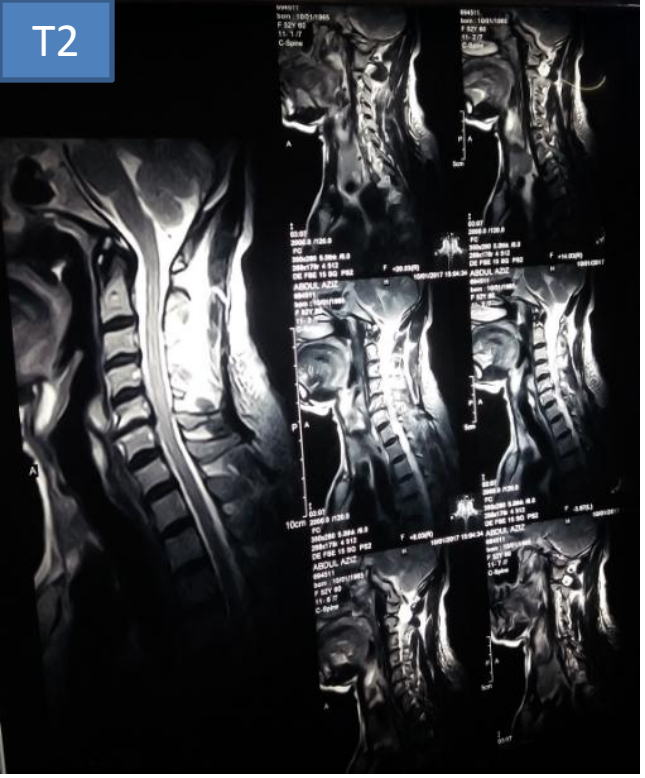

C1 Posterior arch
C2 nerve roots
C3 nerve roots
C4 nerve roots
Posterior longitudinal ligament
C5 nerve roots
C6 nerve roots
C7 nerve roots
C8 nerve roots
T1 nerve roots
T2 nerve roots
T3 nerve roots
intervertebral disc C2-C3
intervertebral disc C3-C4
intervertebral disc C4-C5
intervertebral disc C5-C6
intervertebral disc C6-C7
intervertebral disc C7-T1
intervertebral disc T1-T2
intervertebral disc T2-T3


basilar artery
Clivus
odontoid process (dens)
intervertebral disc C2-C3
intervertebral disc C3-C4
intervertebral disc C4-C5
intervertebral disc C5-C6
intervertebral disc C6-C7
intervertebral disc C7-T1
intervertebral disc T1-T2
intervertebral disc T2-T3
Superior fascicle of cruciform ligament
C1 Posterior arch
spinal cord
C2 spinous process
Posterior longitudinal ligament
Ligamentum flavum
Supraspinous ligament

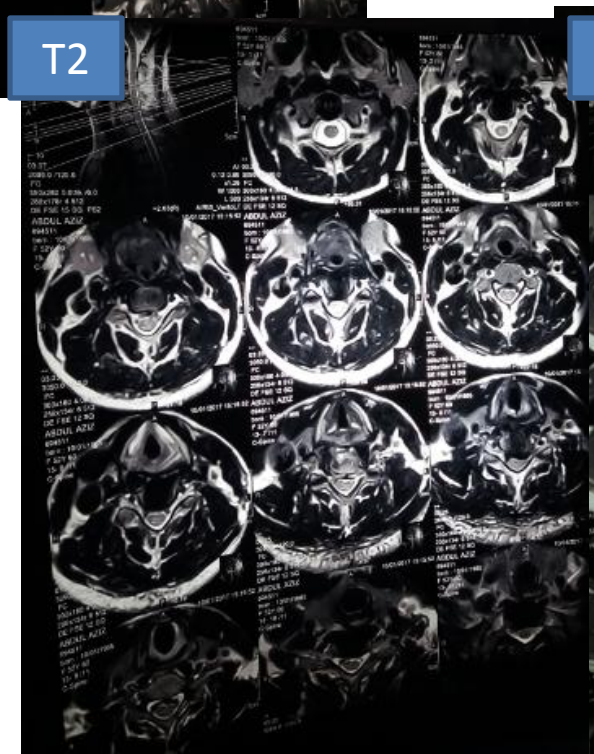

C1 nerve roots
C1 Anterior arch
C1 Posterior arch
intervertebral disc C2-C3
Posterior longitudinal ligament
intervertebral disc C3-C4
spinal cord
intervertebral disc C4-C5
C6 spinous process
intervertebral disc C5-C6
cerebrospinal fluid
C7 spinous process
intervertebral disc C6-C7
Ligamentum flavum
Supraspinous ligament
intervertebral disc C7-T1
T1 spinous process
intervertebral disc T1-T2
T2 spinous process
intervertebral disc T2-T3
T3 spinous process

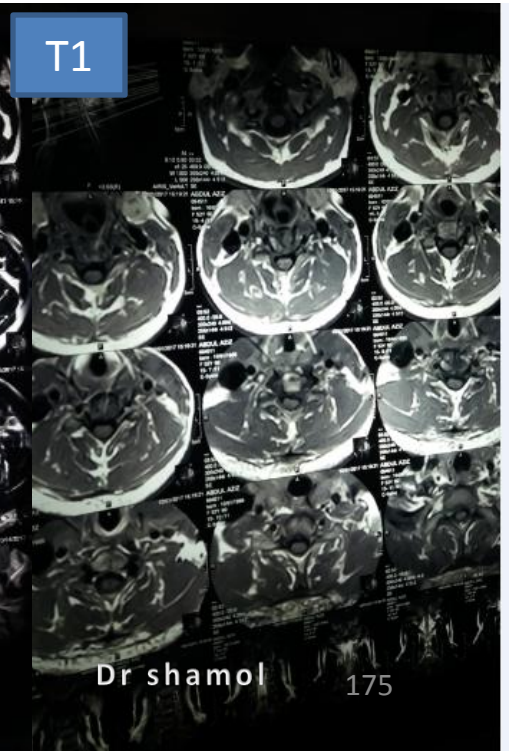

Clivus
Transverse ligament of cruciform ligament
C1
odontoid process (dens)
C2
intervertebral disc C2-C3
C3
intervertebral disc C3-C4
C4
intervertebral disc C4-C5
C5
intervertebral disc C5-C6
C6
intervertebral disc C6-C7
C7
intervertebral disc C7-T1
T1
intervertebral disc T1-T2
T2
intervertebral disc T2-T3
T3
© mrimaster.com
Superior fascicle of cruciform ligament
C1 Posterior arch
C2 spinous process
Posterior longitudinal ligament
C3 spinous process
C4 spinous process
spinal cord
C5 spinous process
C6 spinous process
cerebrospinal fluid
C7 spinous process
Ligamentum flavum
T1 spinous process
Supraspinous ligament
T2 spinous process
© mrimaster.com
T3 spinous process

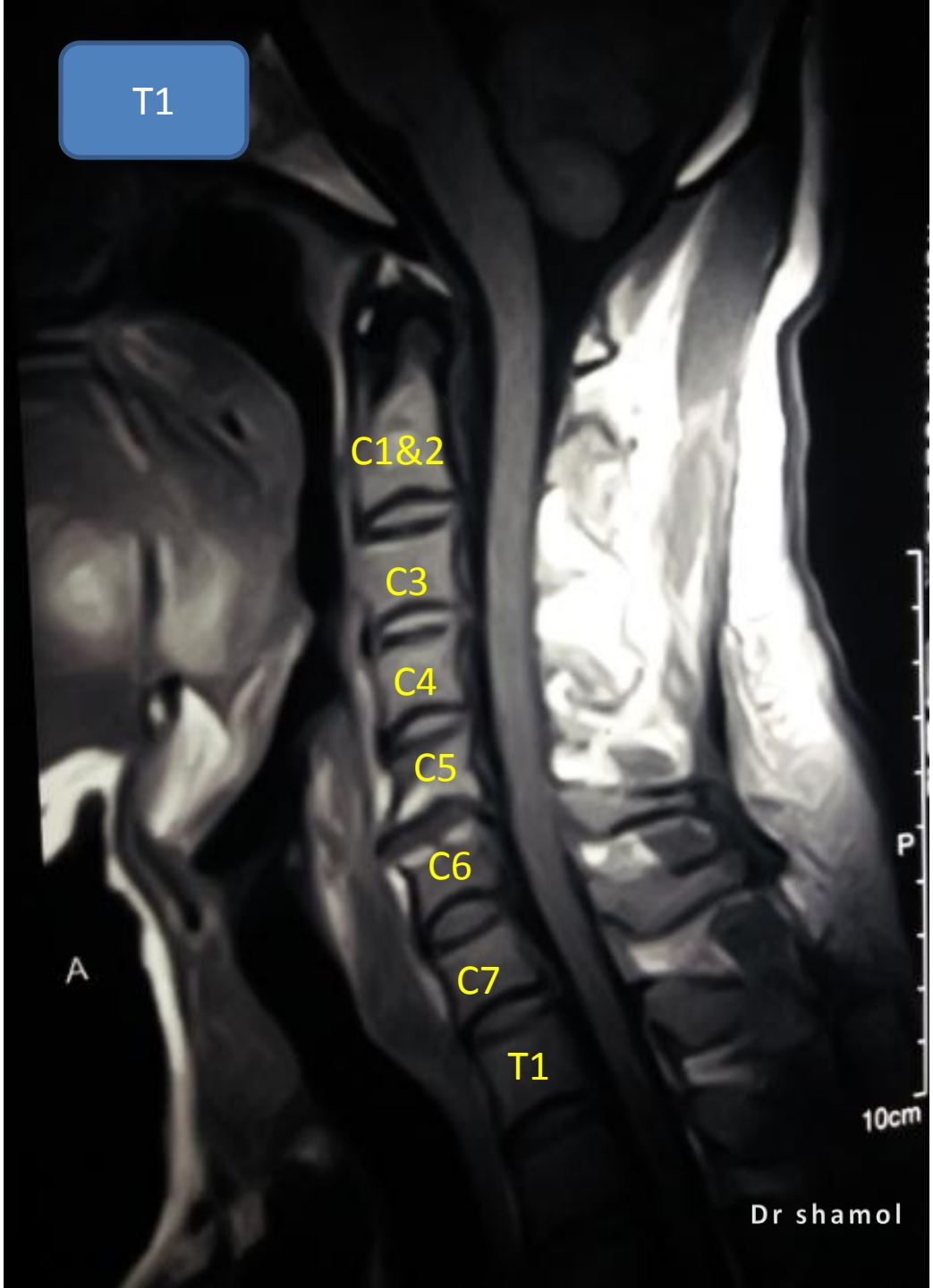
Cervical spine
CS 3

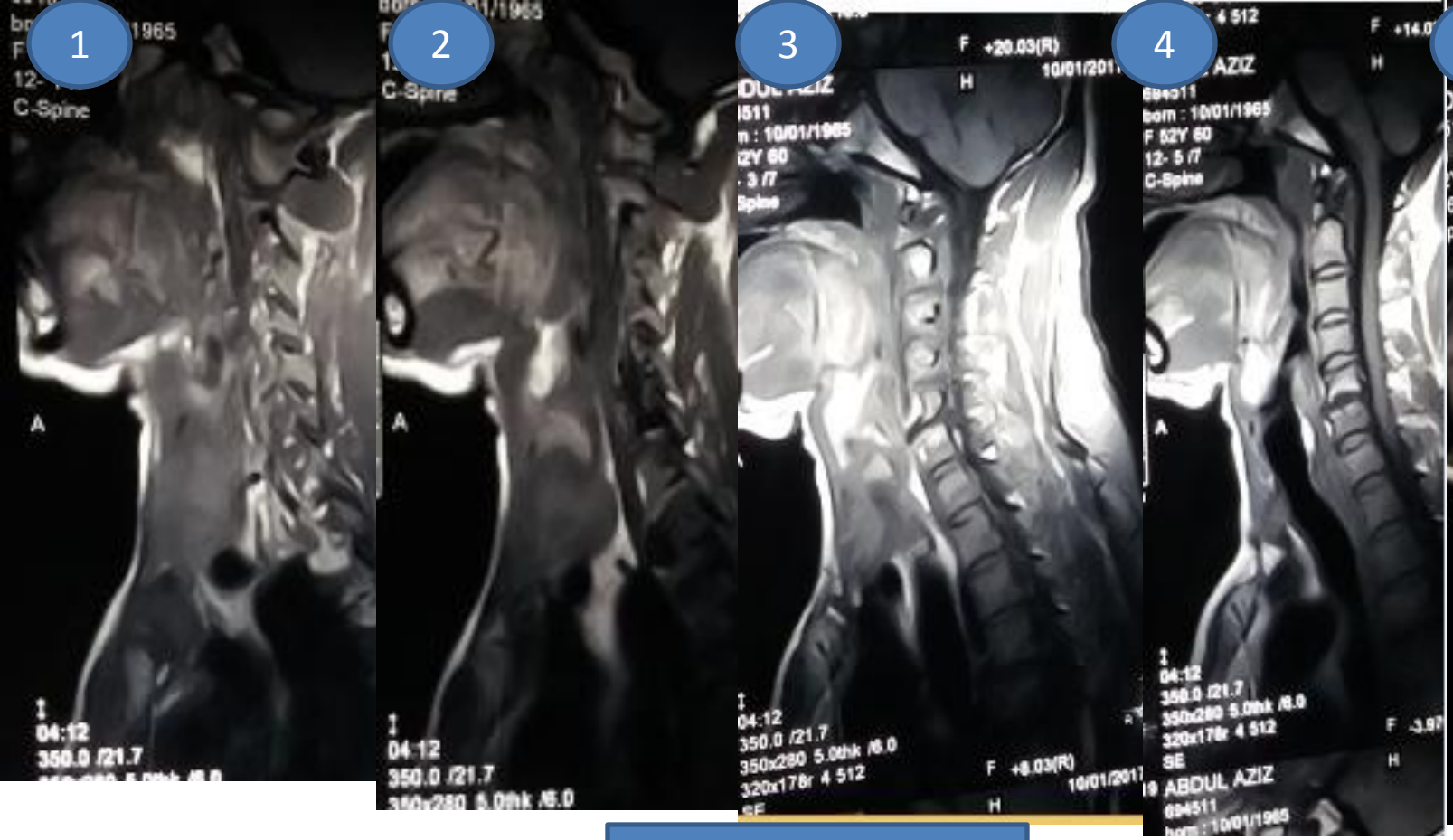

T2


T1

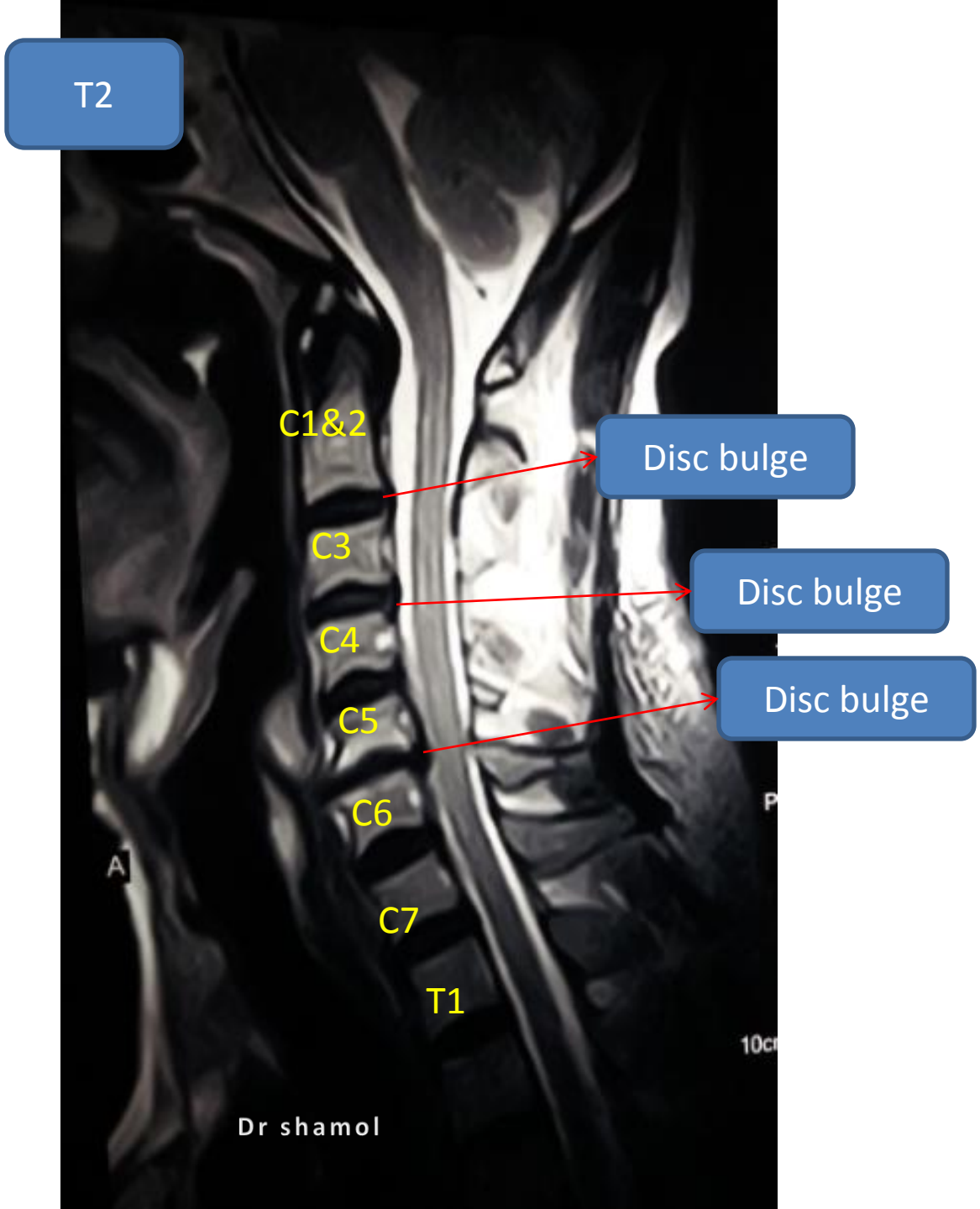

T2

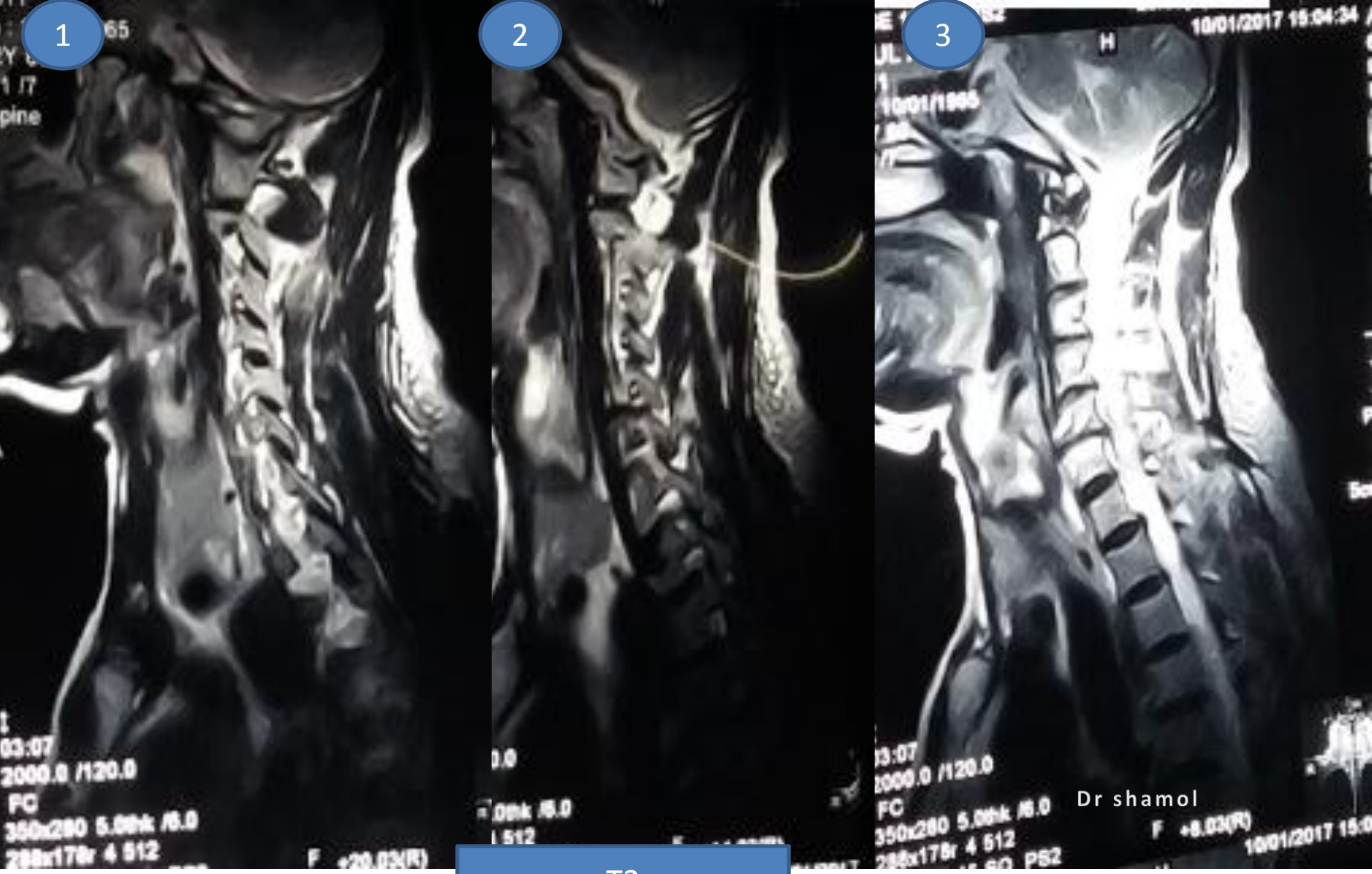

T1
Dr shamol


T1
C1&2
C3
C4
C5
C6
C7
T1
A
P
10cm
Dr shamol

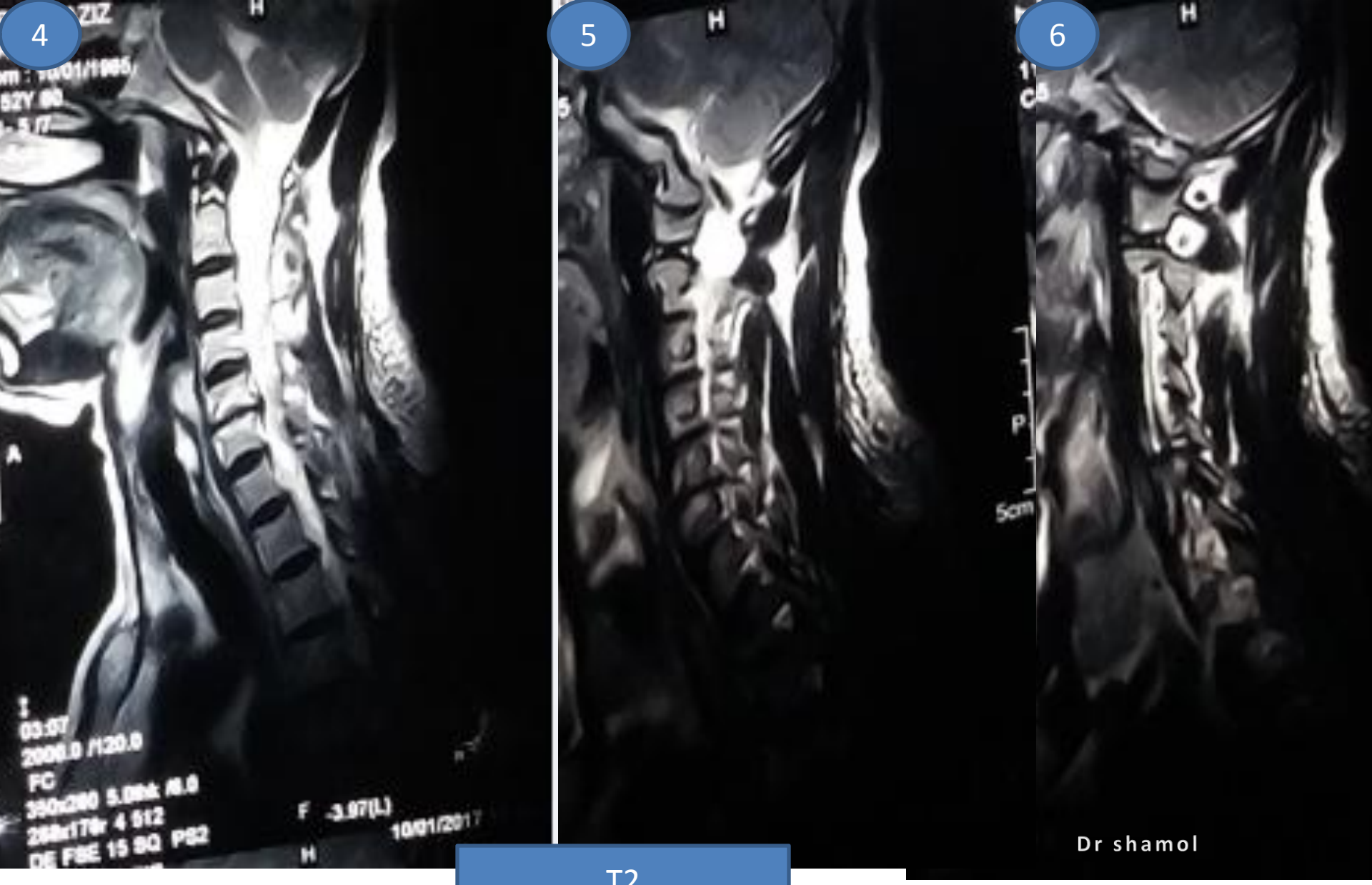


T1

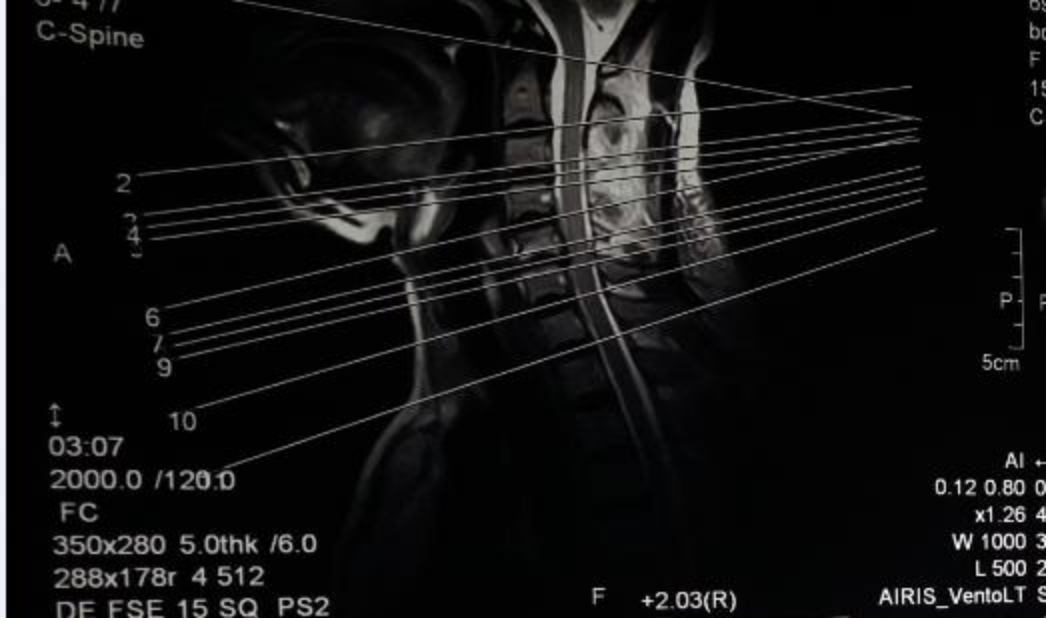

T2
C1&2
C3
C4
C5
C6
C7
T1
Disc bulge
Disc bulge
Disc bulge
A
Dr shamol

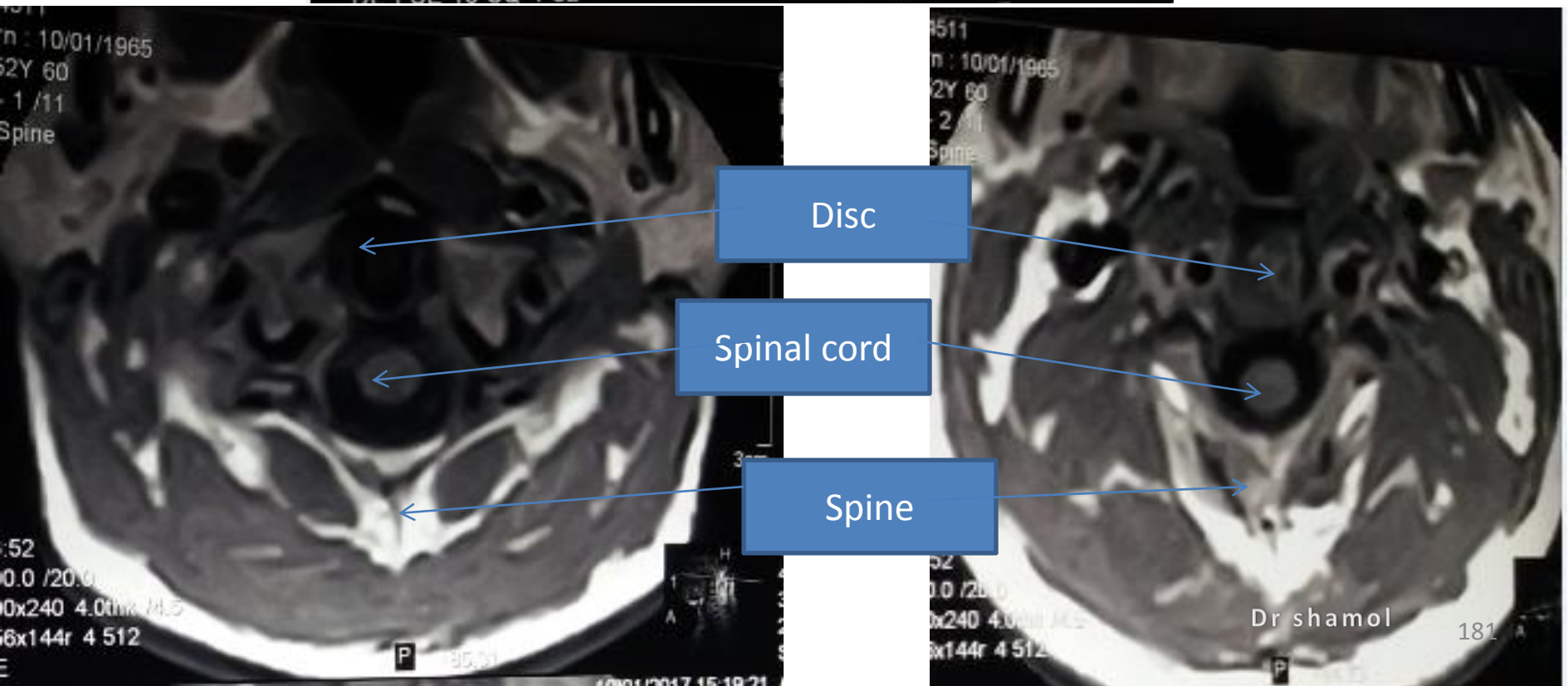


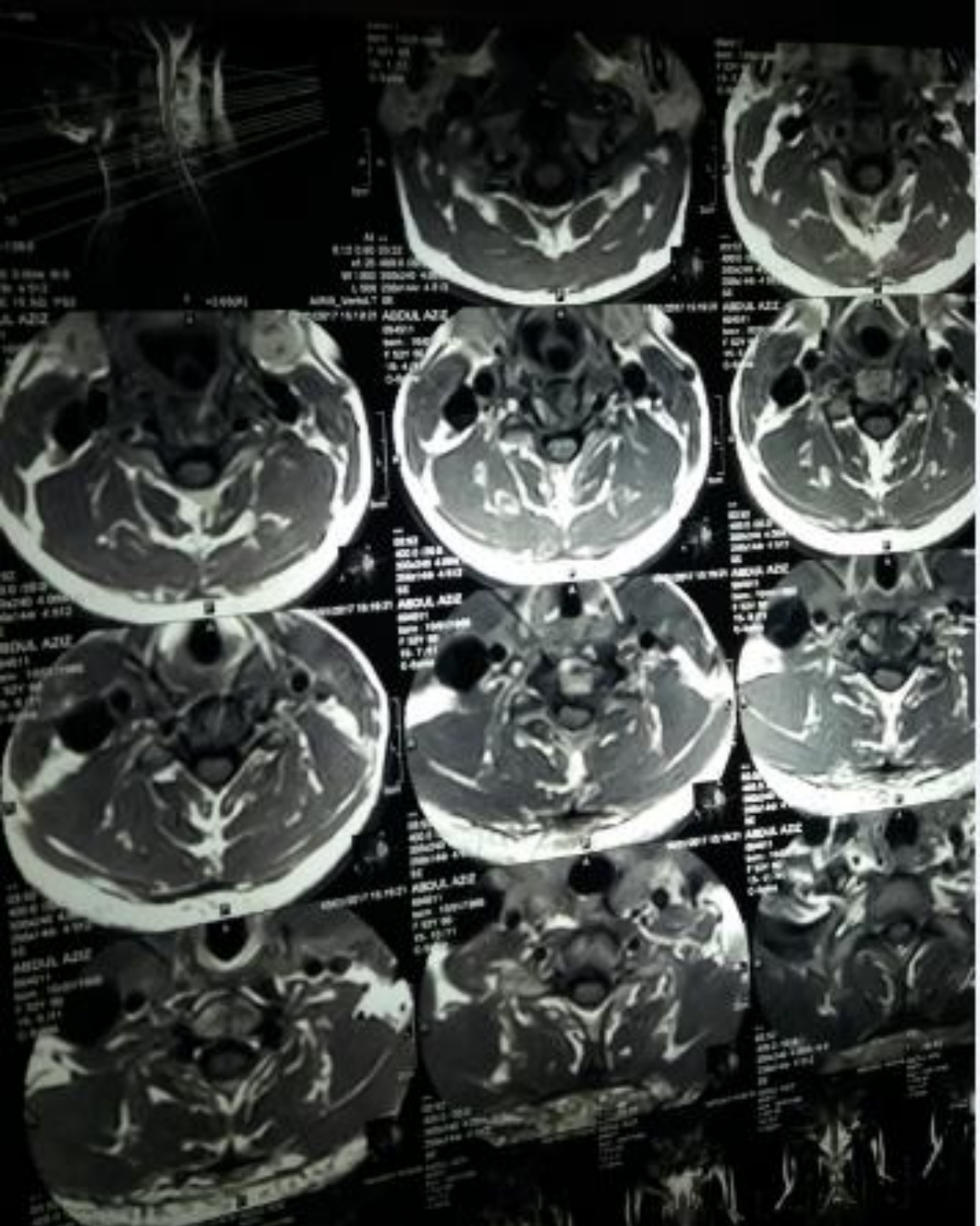
T2



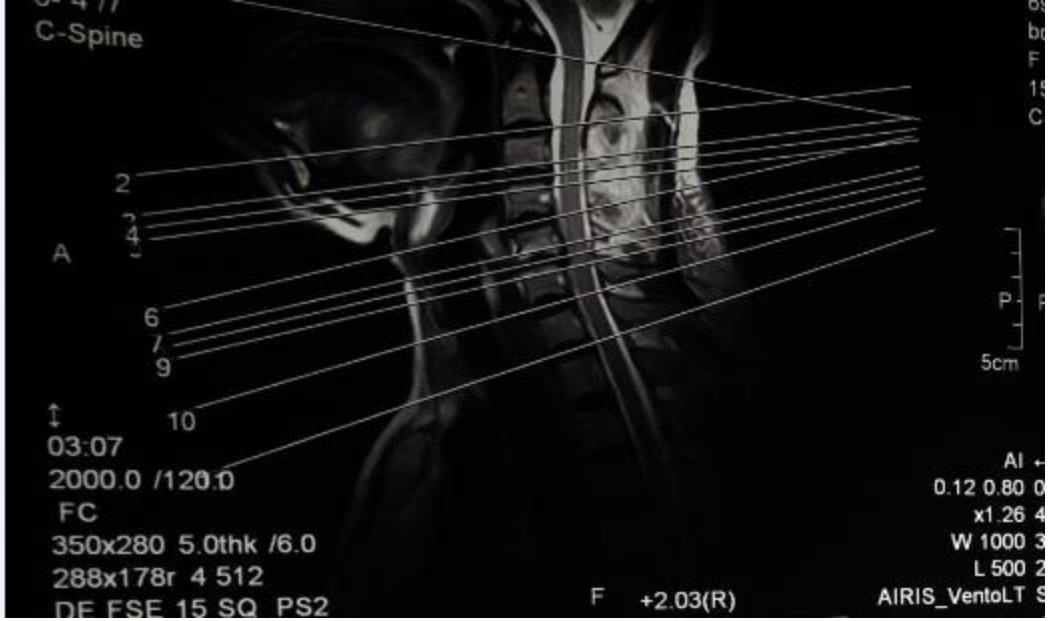
T2

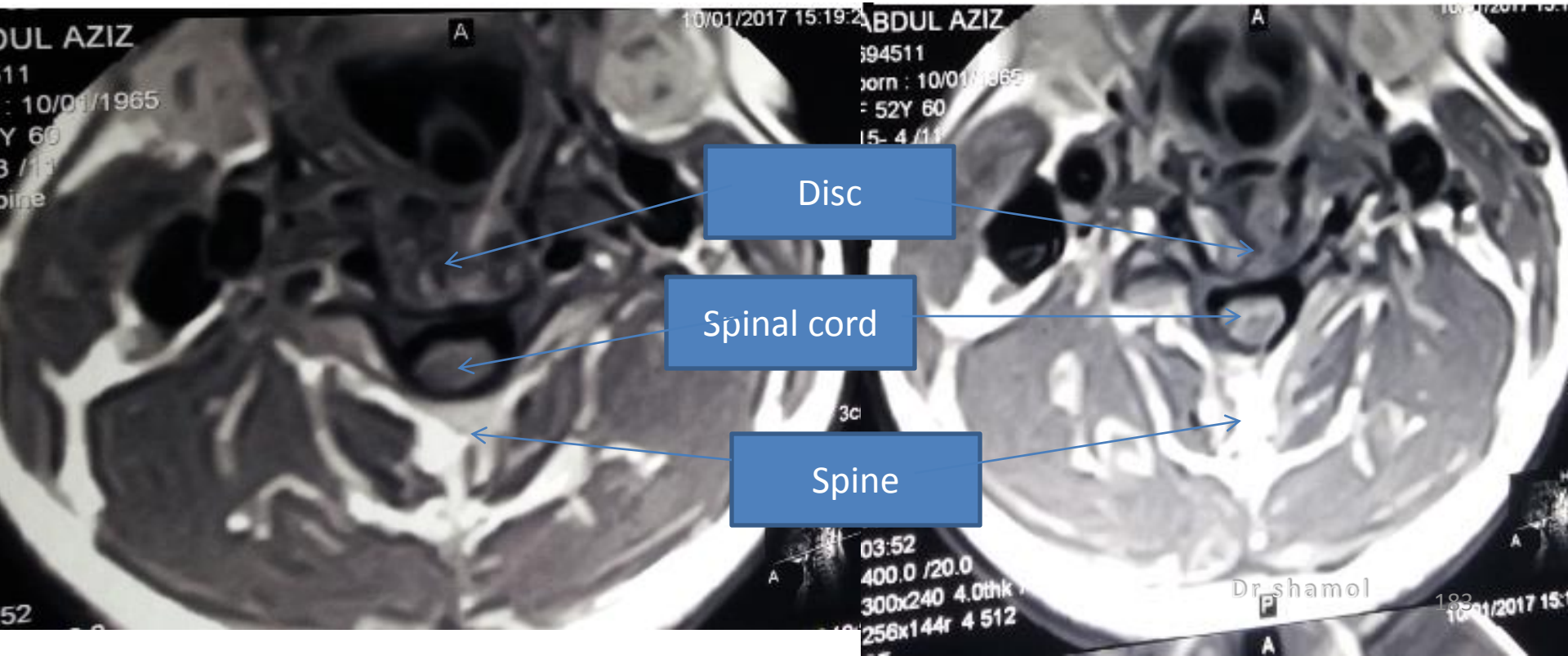

C-Spine
2
3
4
A
6
7
9
10
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
F +2.03(R)
AIRIS_VentoLT

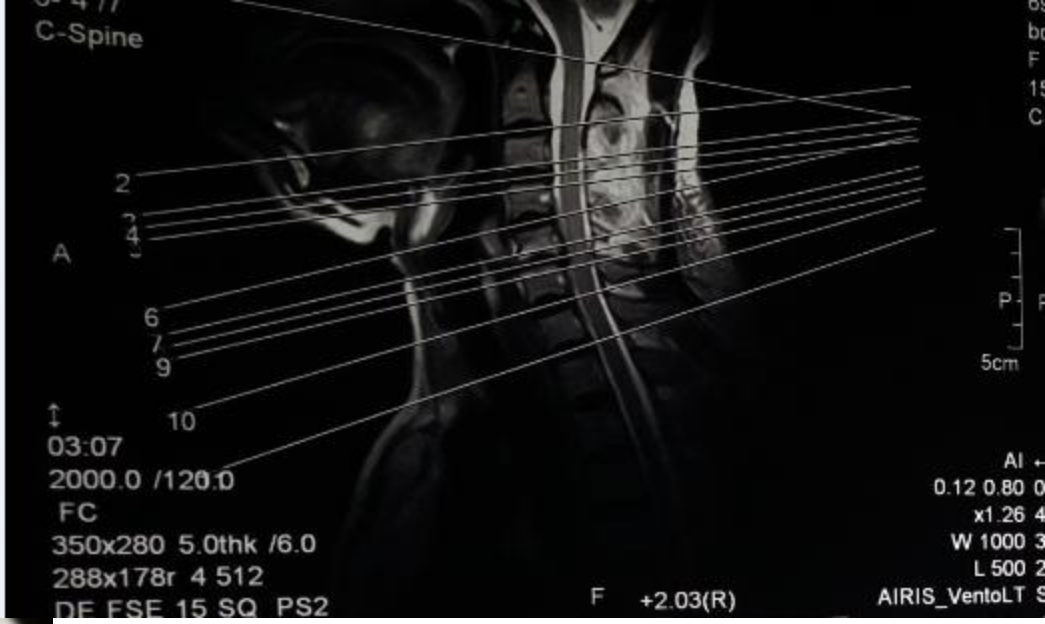

Disc
Spinal cord
Spine
Dr shamol



T1
AXIAL

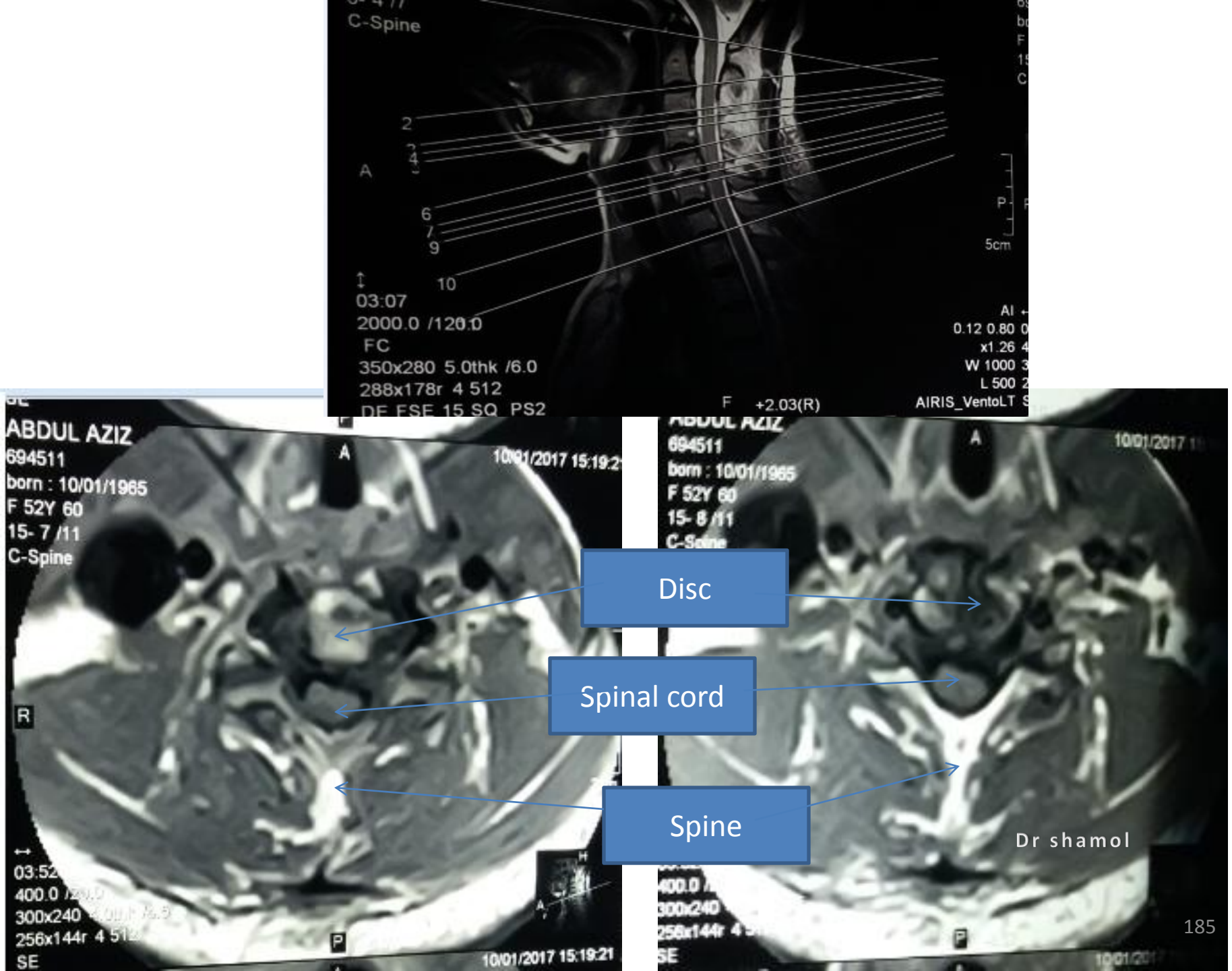

C-Spine
2
4
6
9
10
A
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
F +2.03(R)
AIRIS_VentoLT

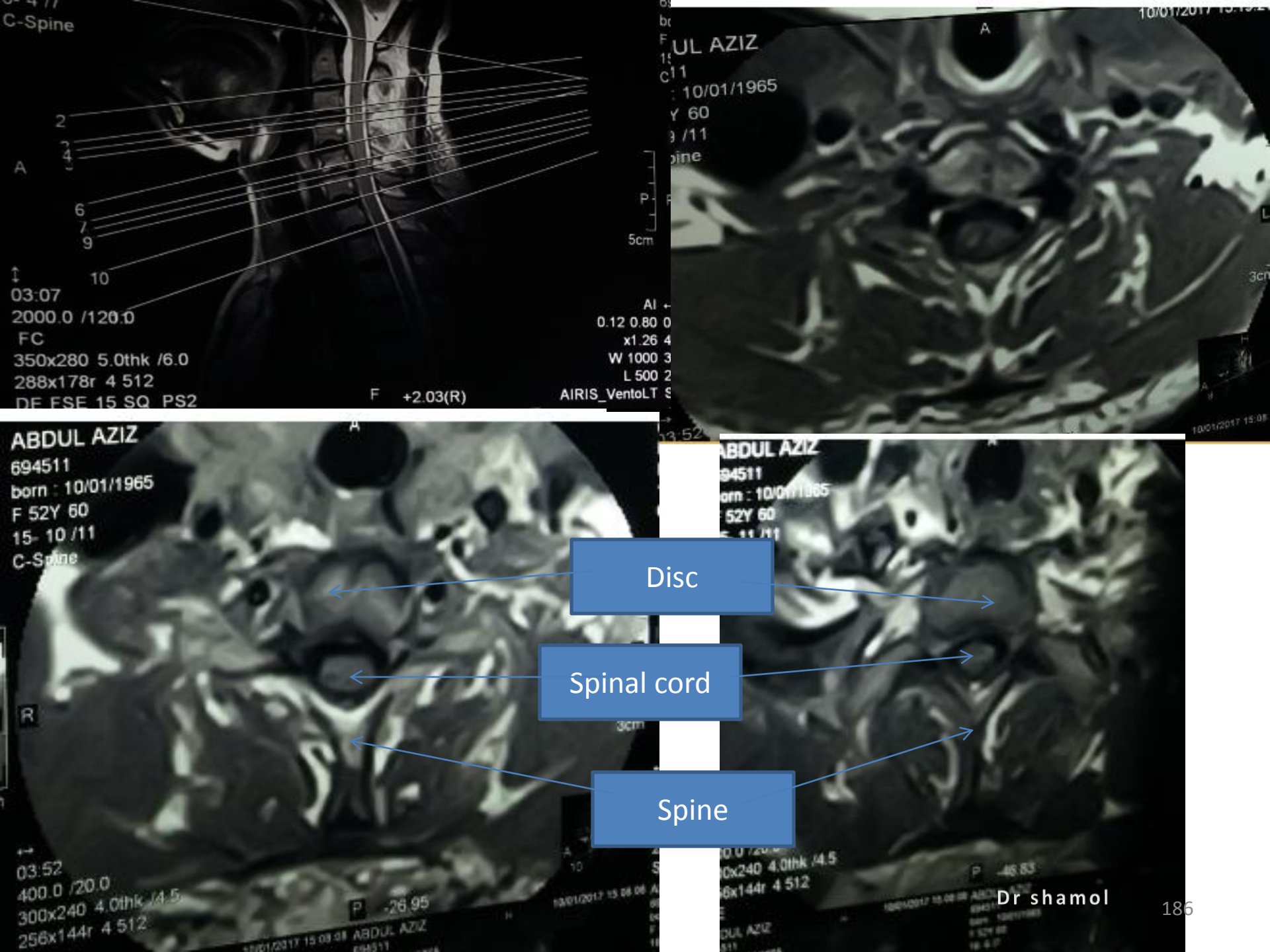

Disc
Spinal cord
Spine
10/01/2017 15:19:2
03:52
400.0 /20.0
300x240 4.0thk
256x144r 4 512
Dr shamol

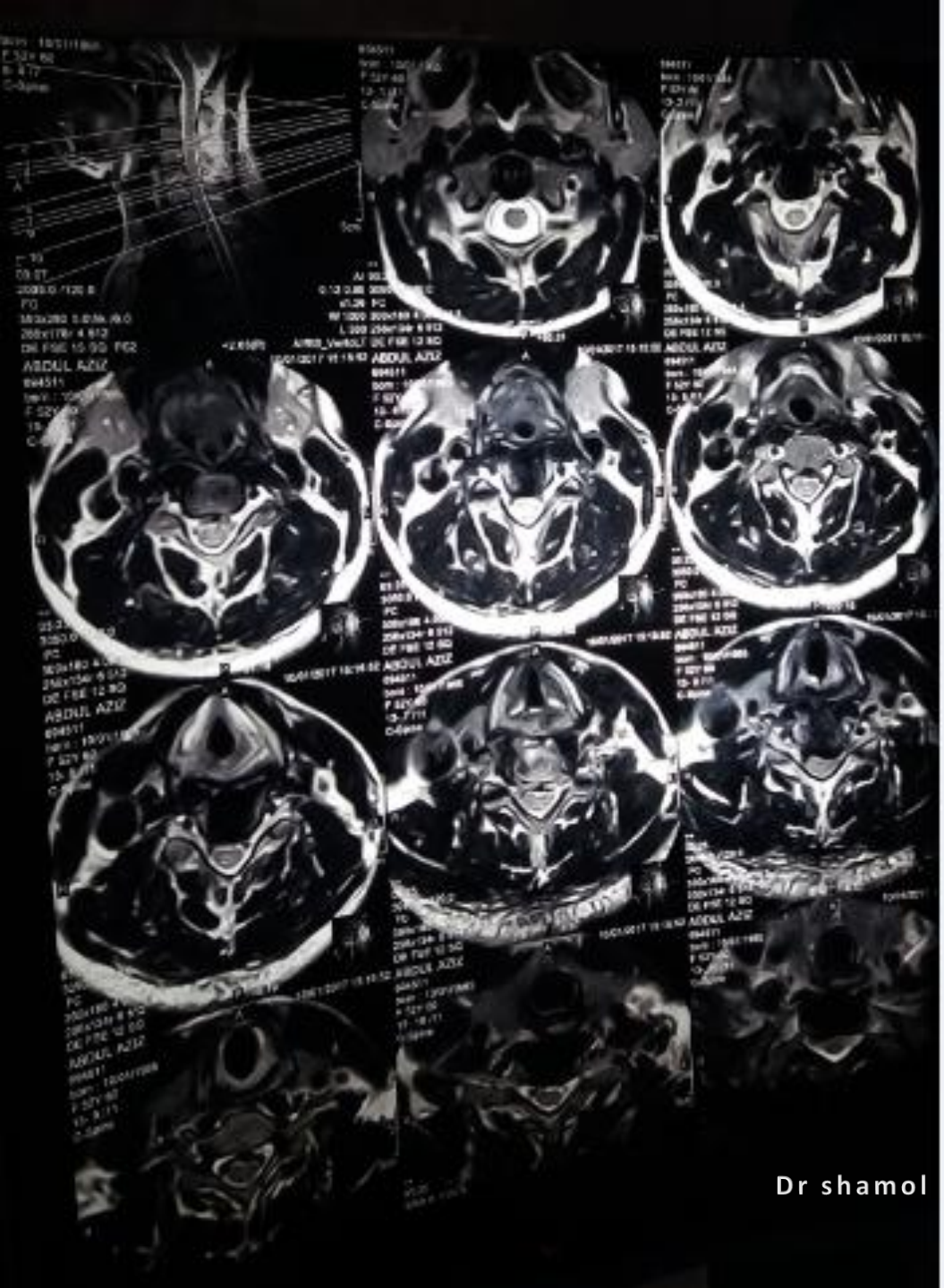

C-Spine
2
4
A
6
9
10
P
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
F +2.03(R)
AIRIS_VentoLT


ABDUL AZIZ
A
P
R

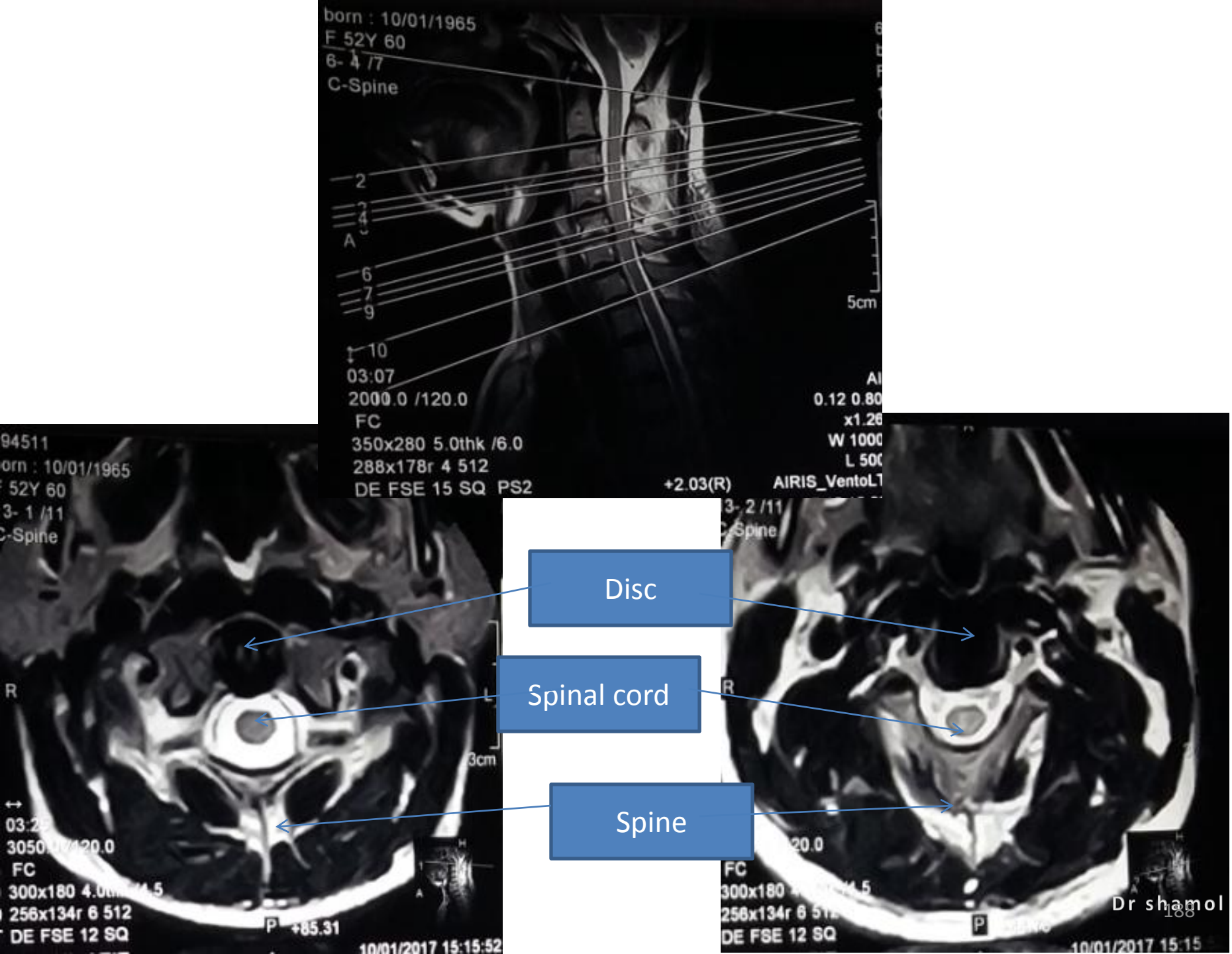

born : 10/01/1965
F 52Y 60
15- 6 /11
C-Spine
A
R
P
03:52
400.0 /20.0
300x240 4.0thk
256x144r 4 512

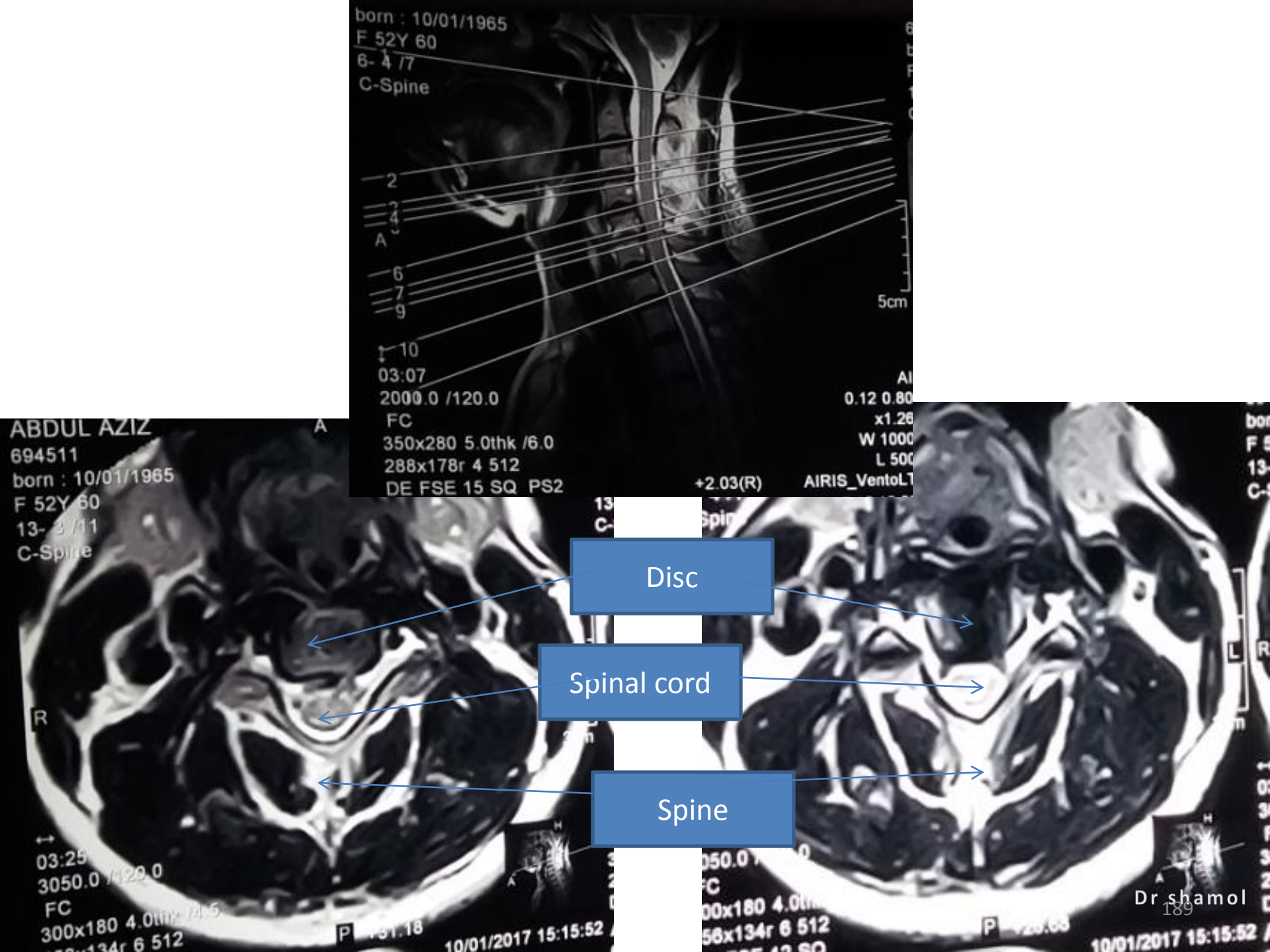

C-Spine
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
5cm
ABDUL AZIZ
694511
born : 10/01/1965
F 52Y 60
15- 7 /11
C-Spine
10/01/2017 15:19:21
Disc
Spinal cord
Spine
Dr shamol

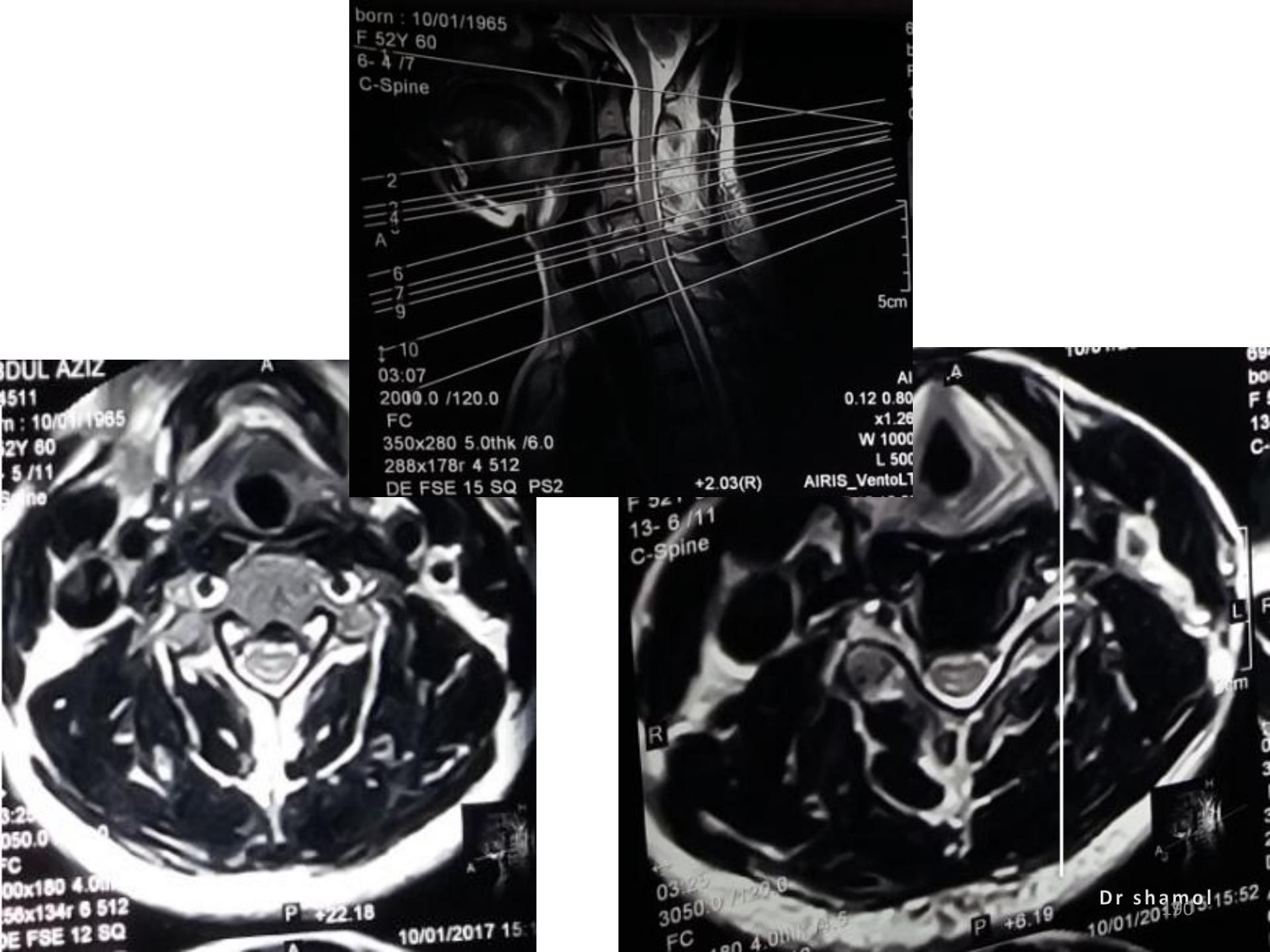

C-Spine
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
F +2.03(R)
AIRIS_VentoLT
5cm
UL AZIZ
10/01/1965
ABDUL AZIZ
694511
born : 10/01/1965
F 52Y 60
15- 10 /11
C-Spine
03:52
400.0 /20.0
300x240 4.0thk /4.5
256x144r 4 512
Disc
Spinal cord
Spine
Dr shamol

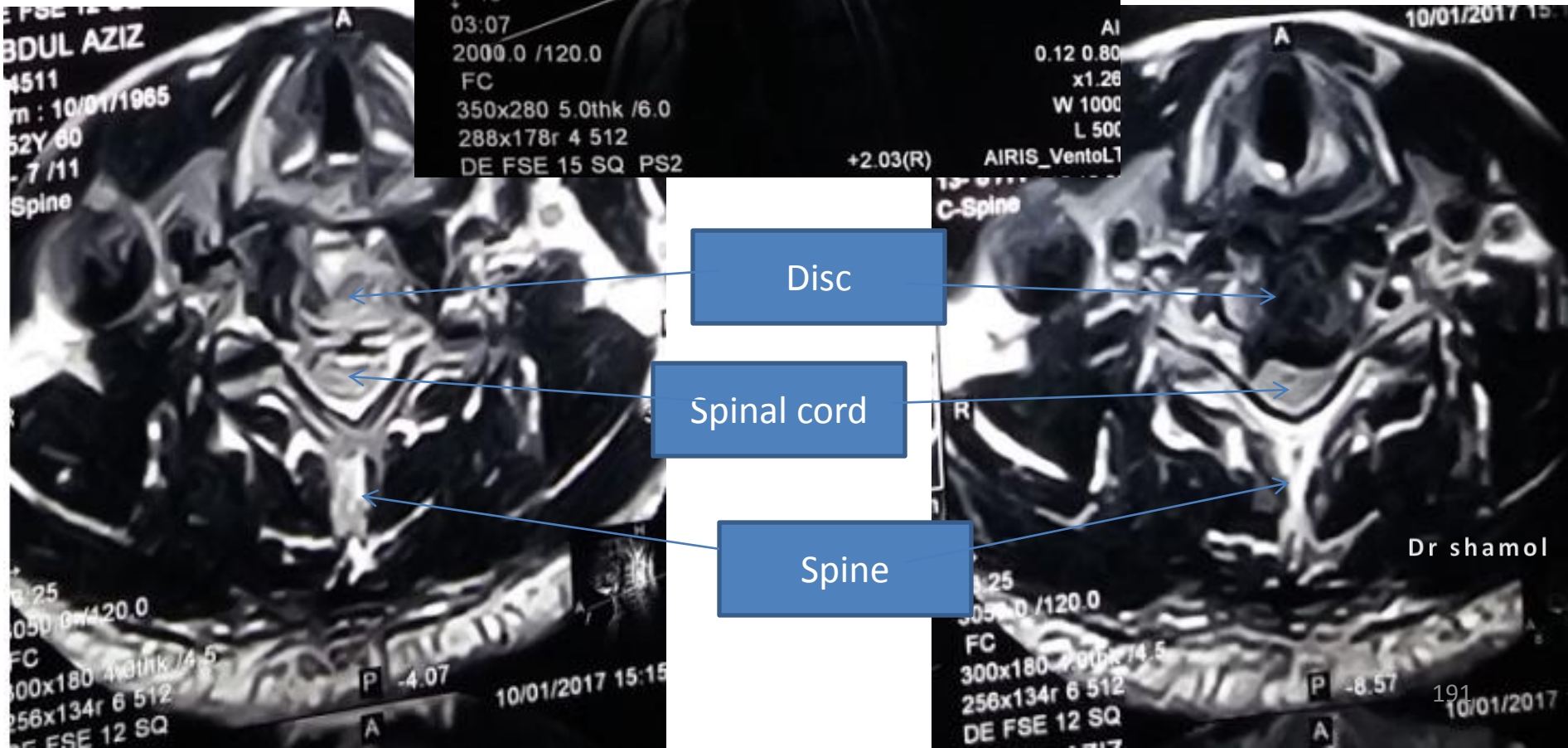


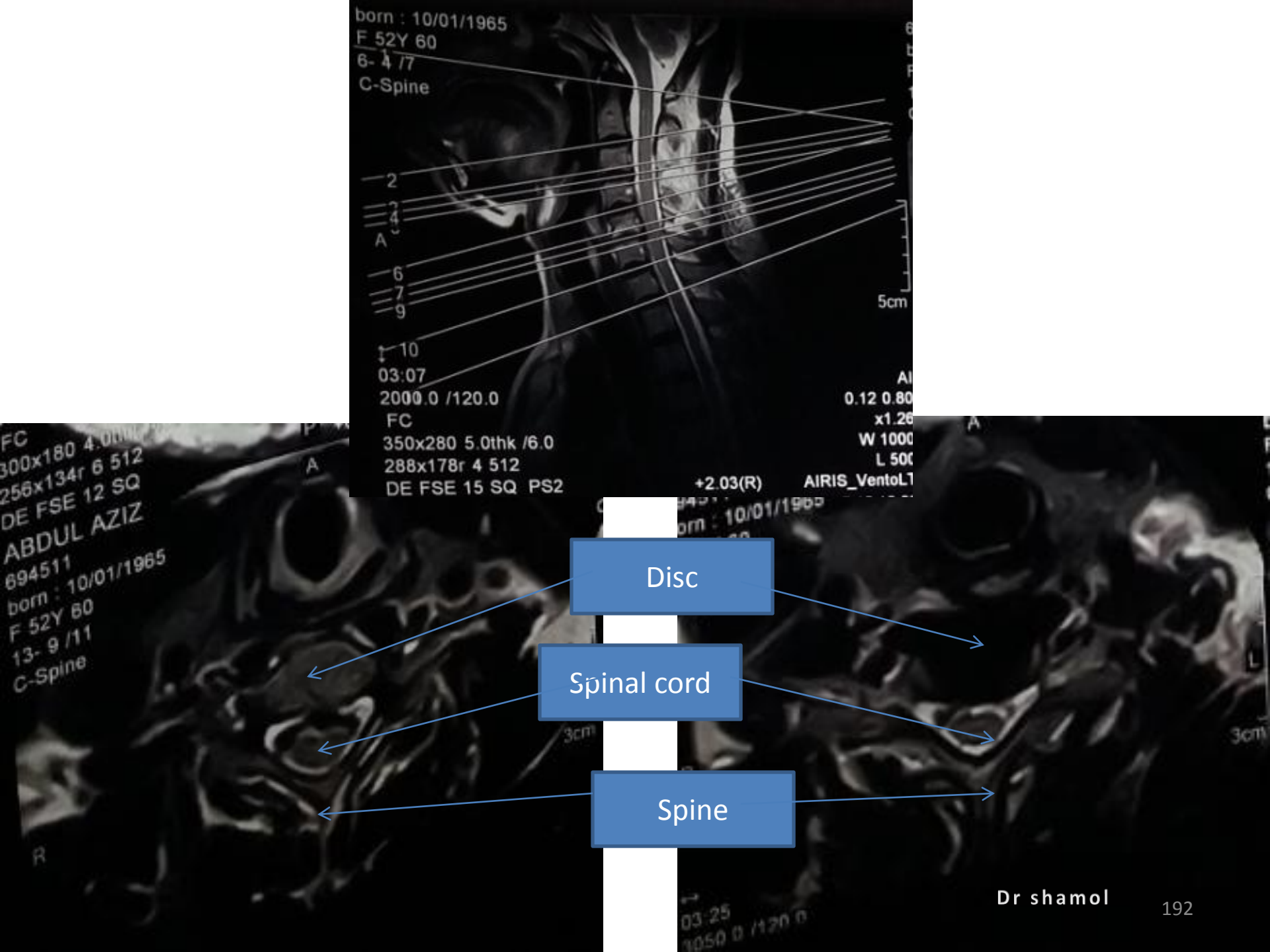
T2
AXIAL


born : 10/01/1965
F 52Y 60
6- 4 /7
C-Spine
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
+2.03(R)
AIRIS_VentoLT
Disc
Spinal cord
Spine
Dr shamol


born : 10/01/1965
F 52Y 60
C-Spine
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
+2.03(R)
AIRIS_VentoLT
ABDUL AZIZ
694511
born : 10/01/1965
F 52Y 60
C-Spine
Disc
Spinal cord
Spine
10/01/2017 15:15:52
Dr shamol

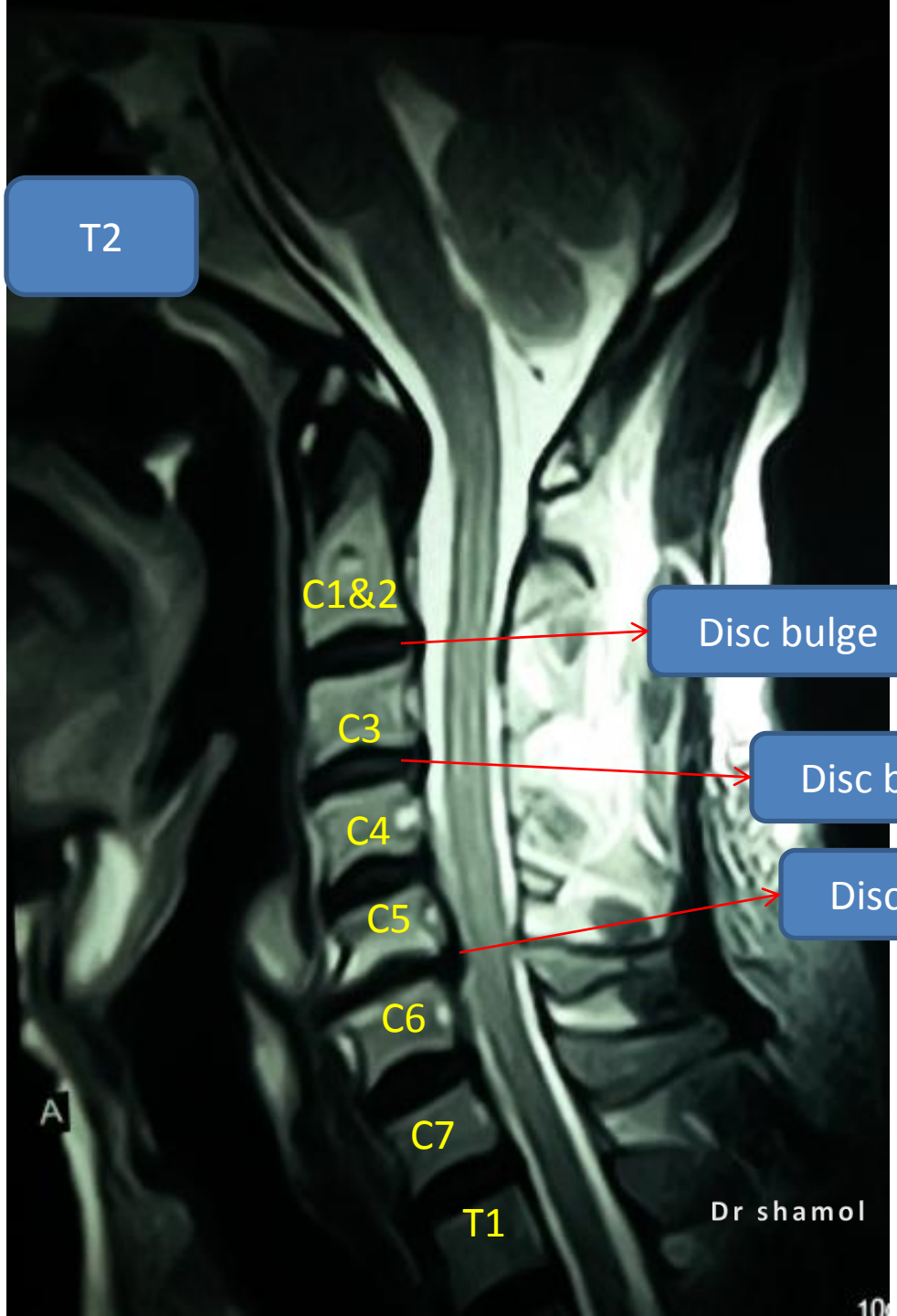

born : 10/01/1965
F 52Y 60
6- 4 /7
C-Spine
2
3
4
A
6
7
9
10
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
+2.03(R)
AIRIS_VentoLT
0.12 0.80
x1.26
W 1000
L 500
13- 6 /11
C-Spine
R
L
P +22.18
10/01/2017
P +6.19
Dr shamol


Disc
Spinal cord
Spine
Dr shamol


born : 10/01/1965
F 52Y 60
6- 4 /7
C-Spine
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
+2.03(R)
AIRIS_VentoL
ABDUL AZIZ
694511
born : 10/01/1965
F 52Y 60
13- 9 /11
C-Spine
Disc
Spinal cord
Spine

Dr shamol

CERVICAL SPONDYLOSIS
CS 1



MID sagittal

Disc bulge

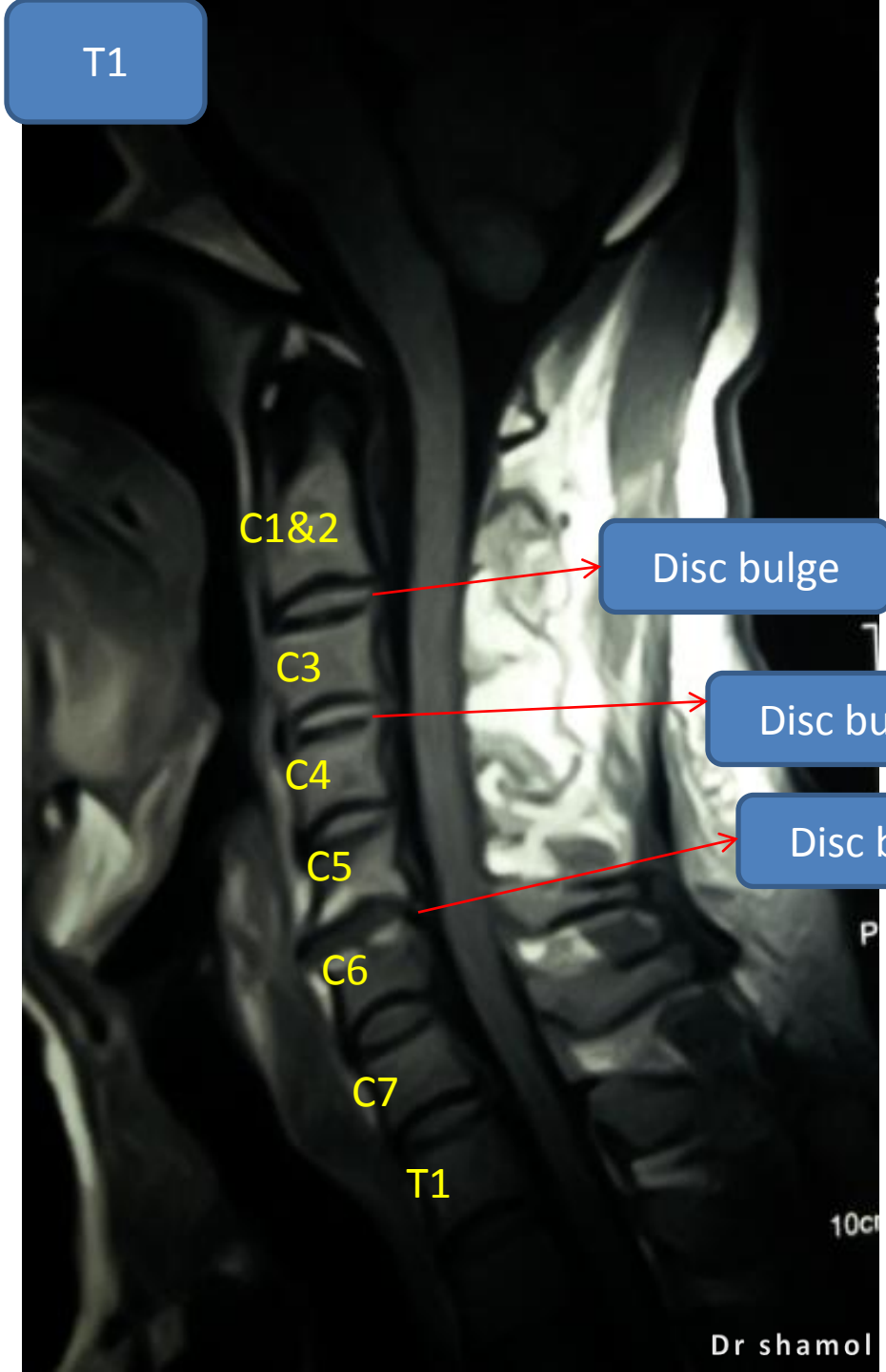
Disc bulge

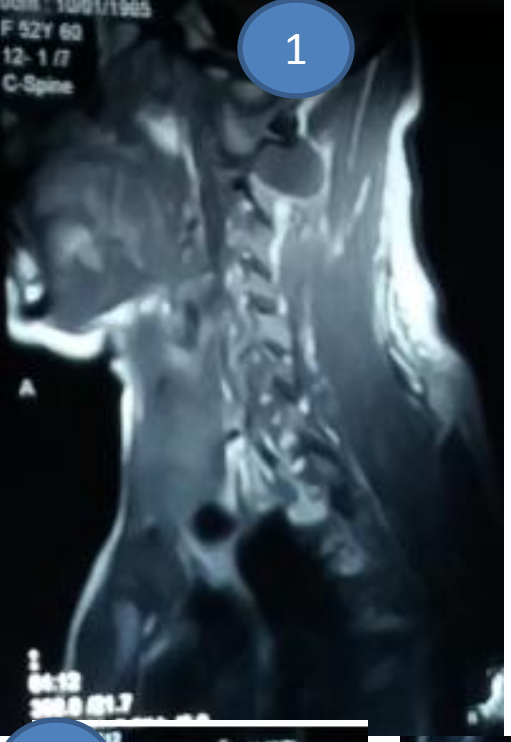
Disc bulge

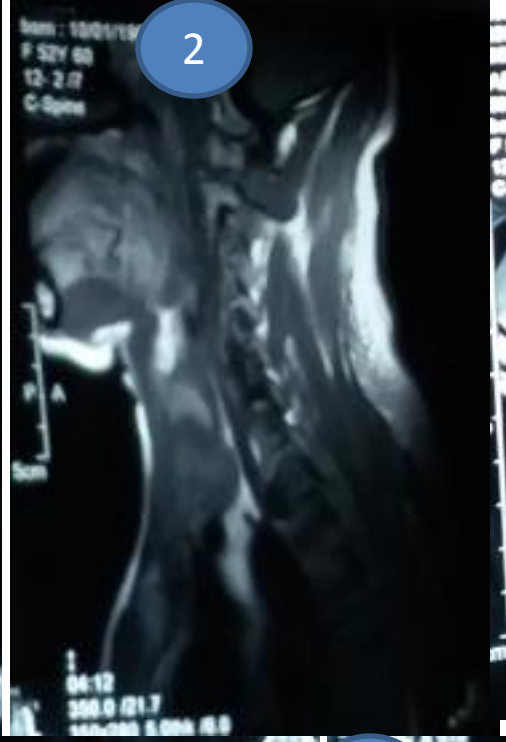


T2

Para sagittal


T1
C1&2
C3
C4
C5
C6
C7
T1
Disc bulge
Disc bulge
Disc bulge
MID sagittal
Dr shamol







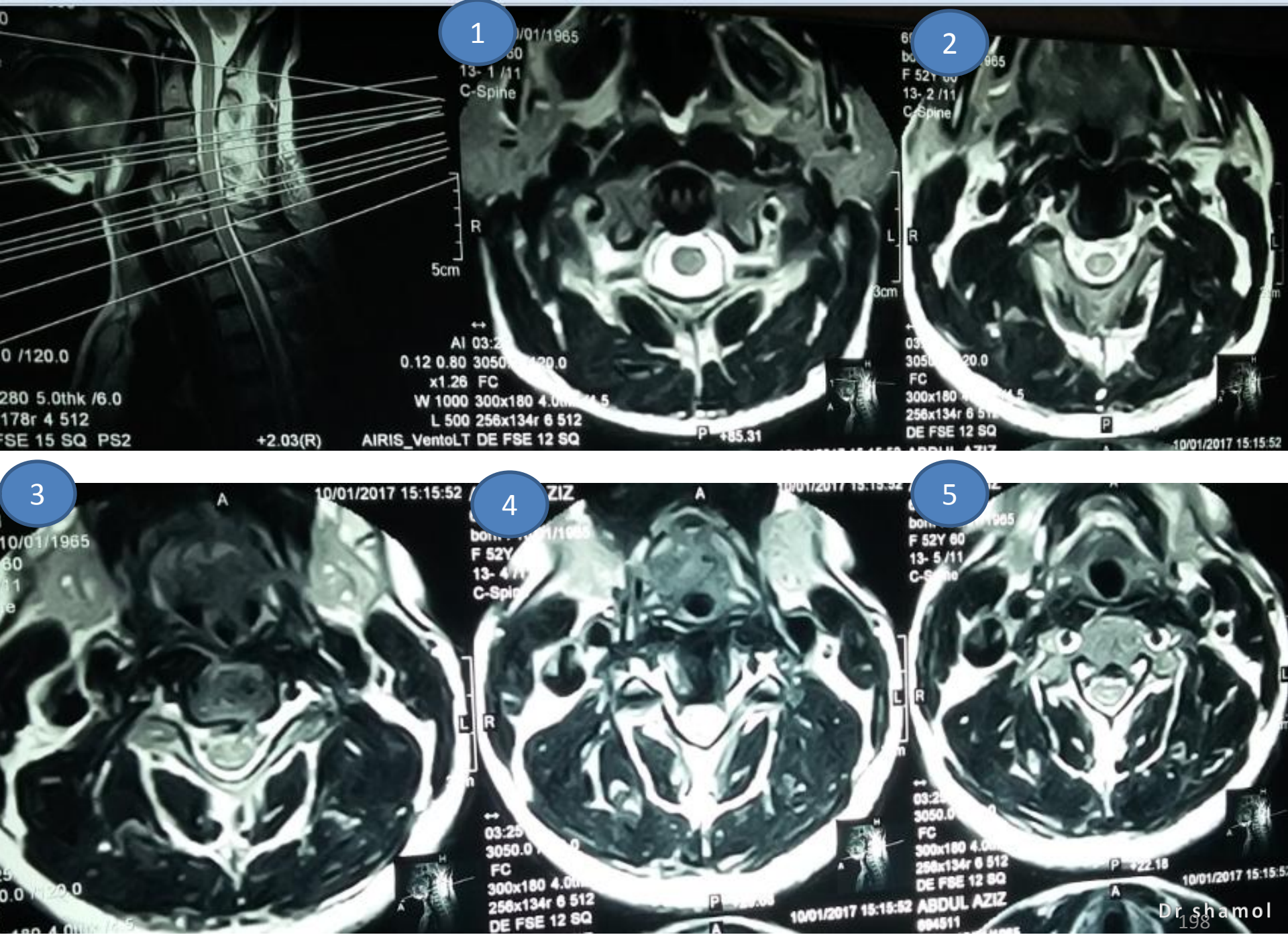


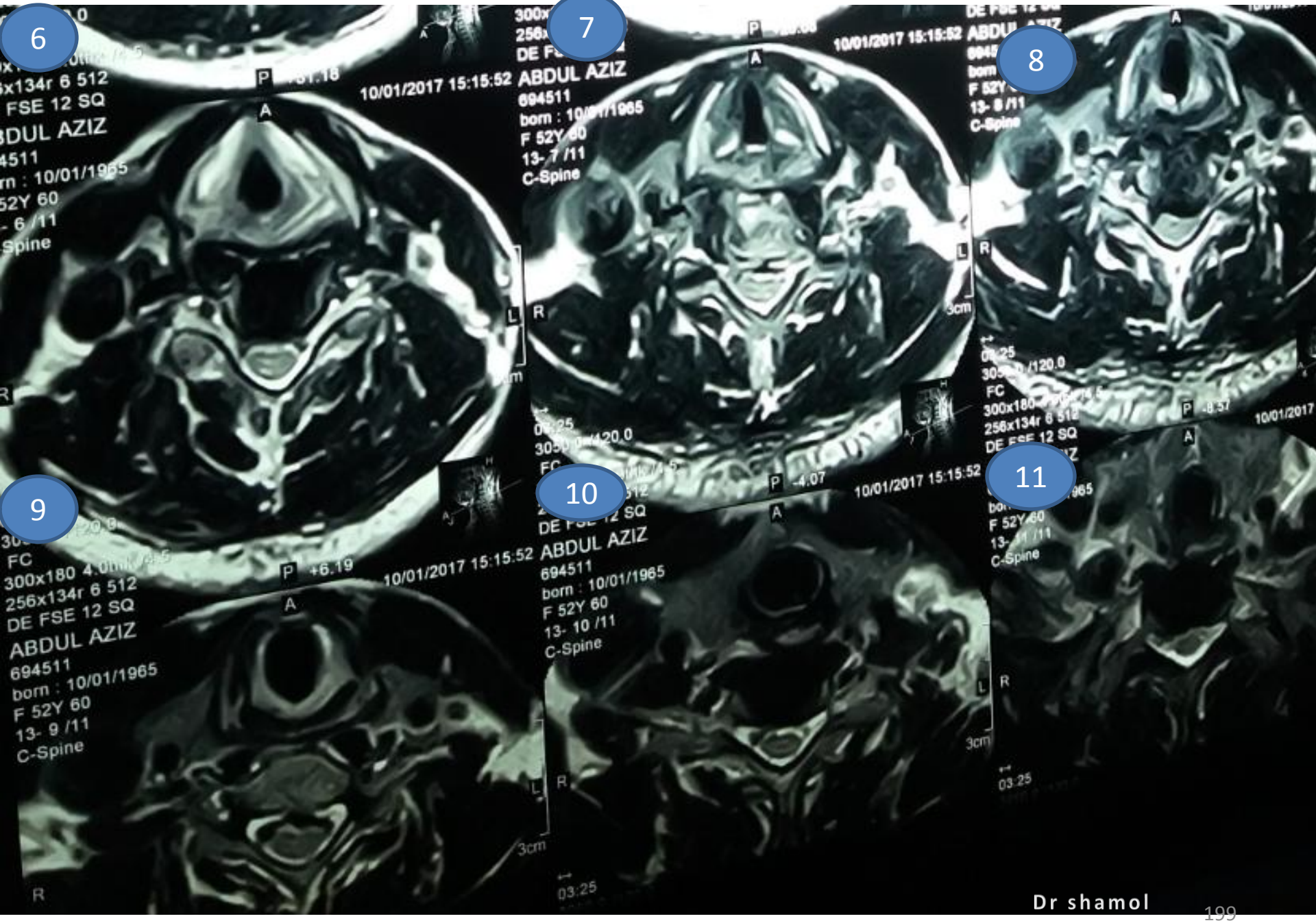


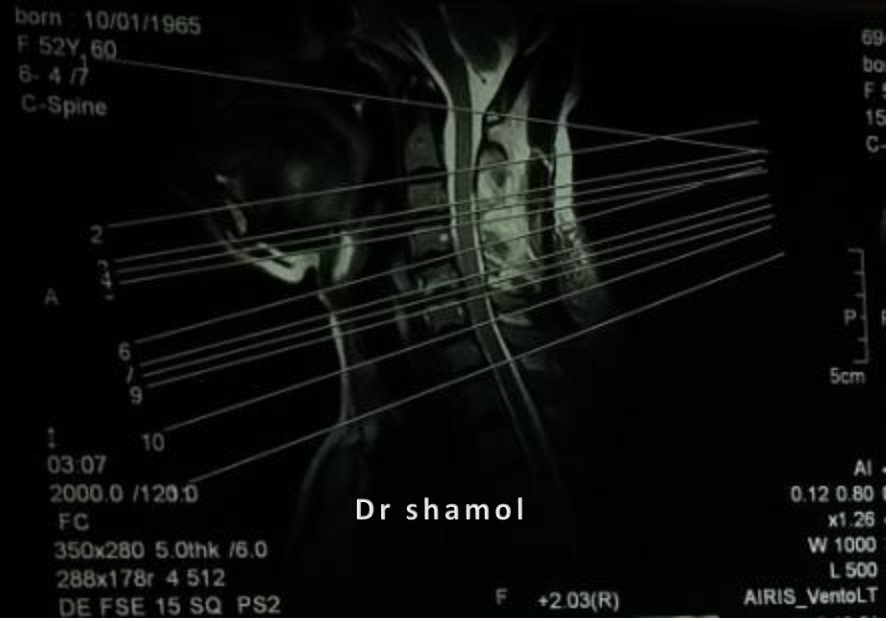


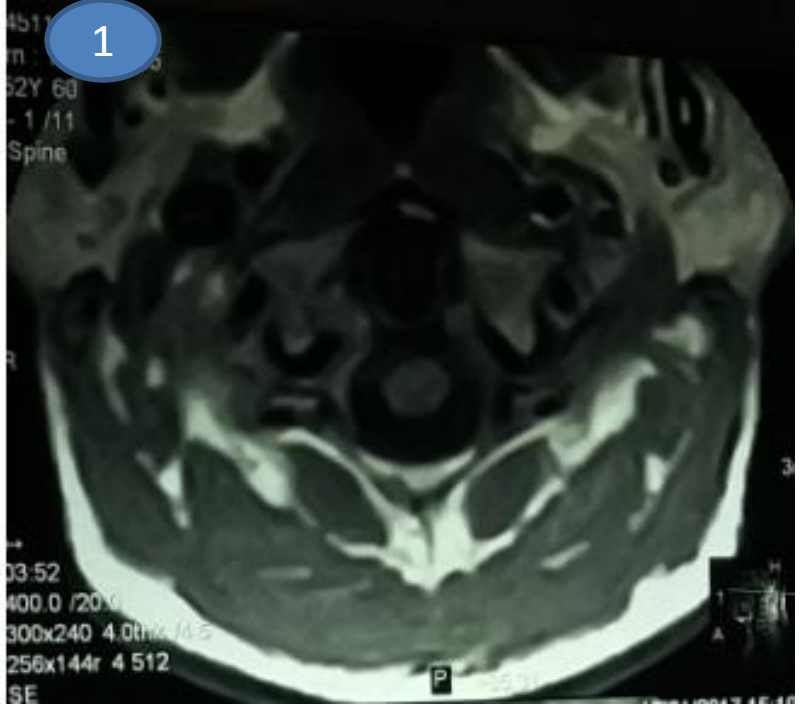
T1

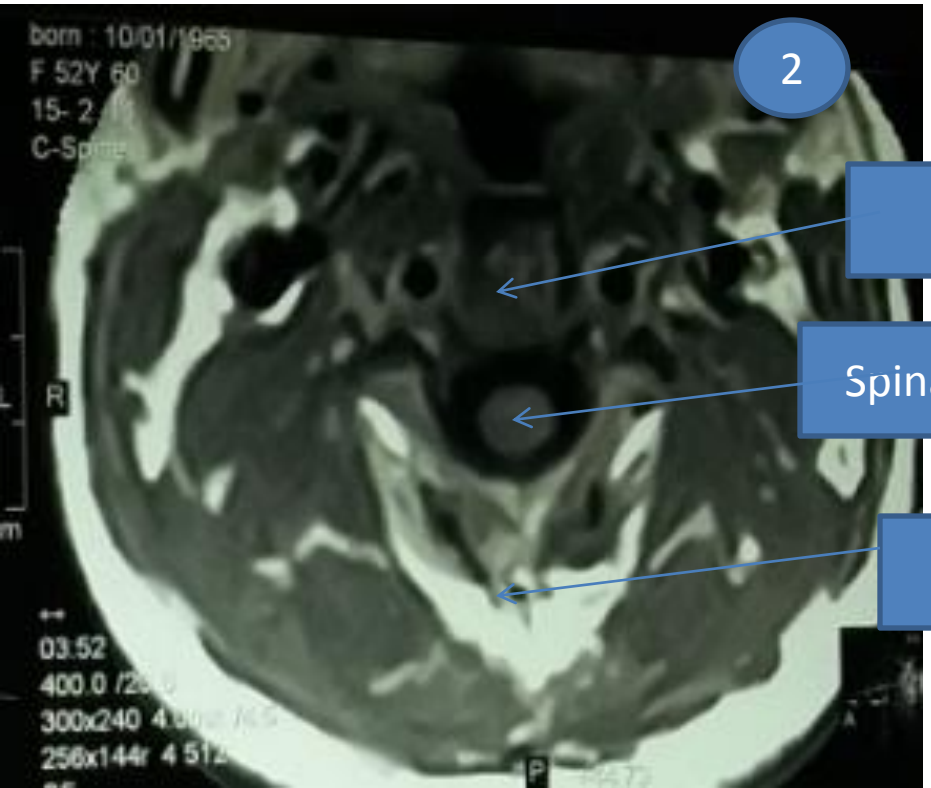
Para sagittal

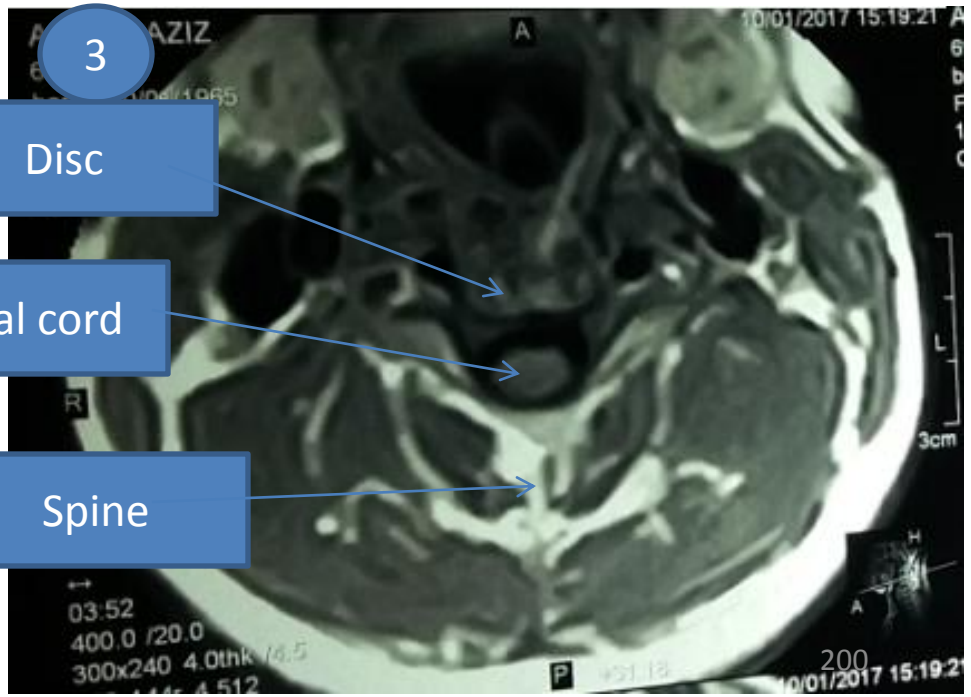

1
2
3
4
5
C-Spine
5cm
3cm
10/01/2017 15:15:52
ABDUL AZIZ

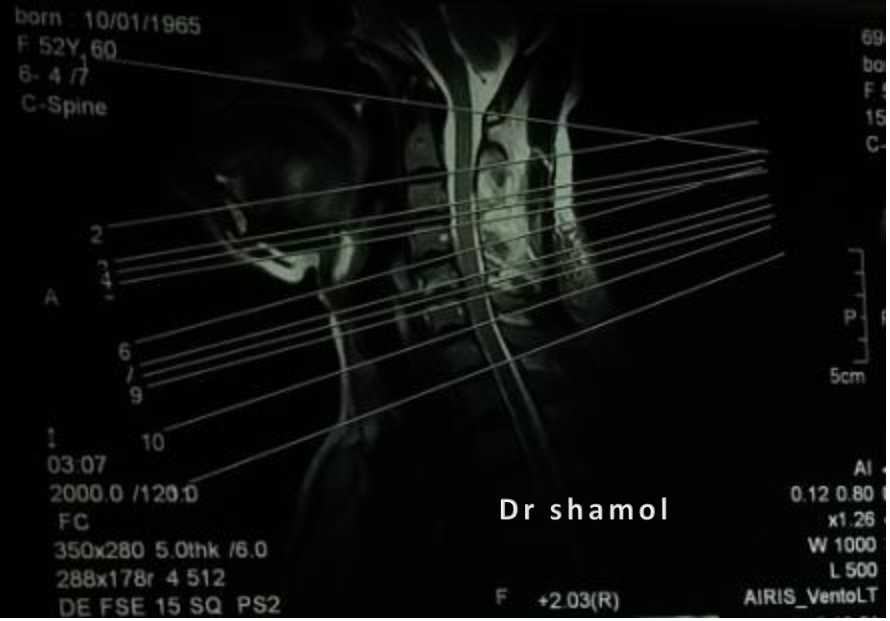

6
7
8
9
10
11
10/01/2017 15:15:52
ABDUL AZIZ
694511
born : 10/01/1965
F 52Y 60
C-Spine
Dr shamol

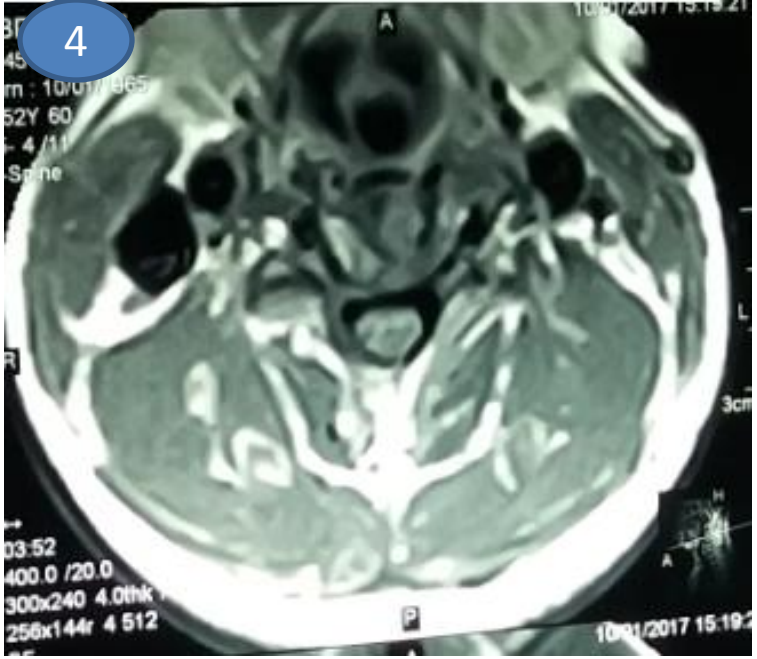

born 10/01/1965
F 52Y 60
C-Spine
Dr shamol
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
F +2.03(R)
AIRIS_VentoLT
W 1000
L 500
5cm

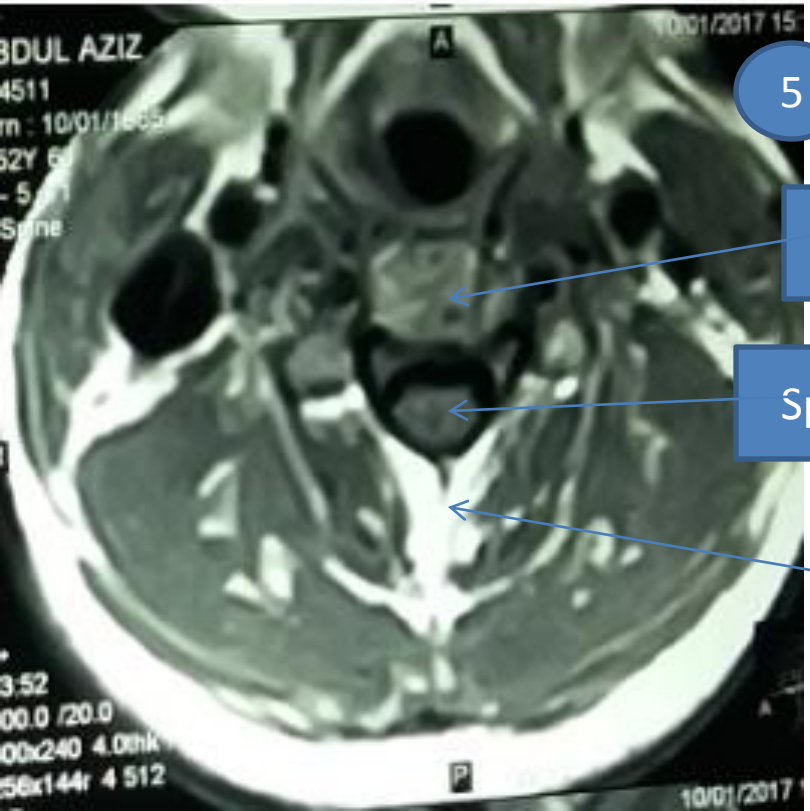

1
Spine
03:52
256x144r 4 512

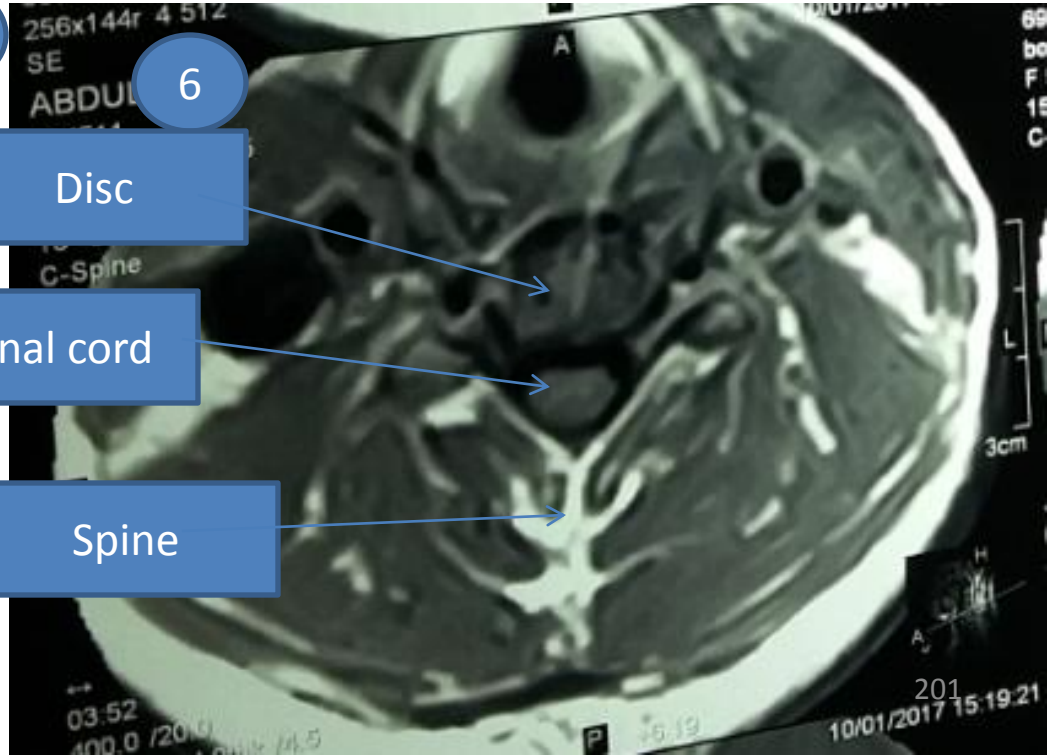

2
born 10/01/1965
F 52Y 60
C-Spine
03:52
256x144r 4 512

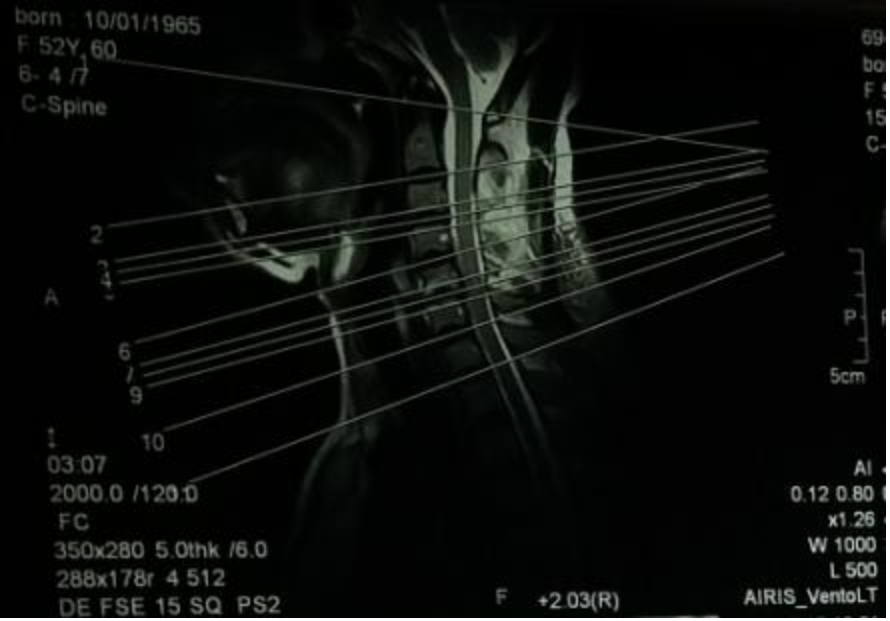

3
Disc
Spinal cord
Spine
03:52
400.0 /20.0
300x240 4.0thk
3cm

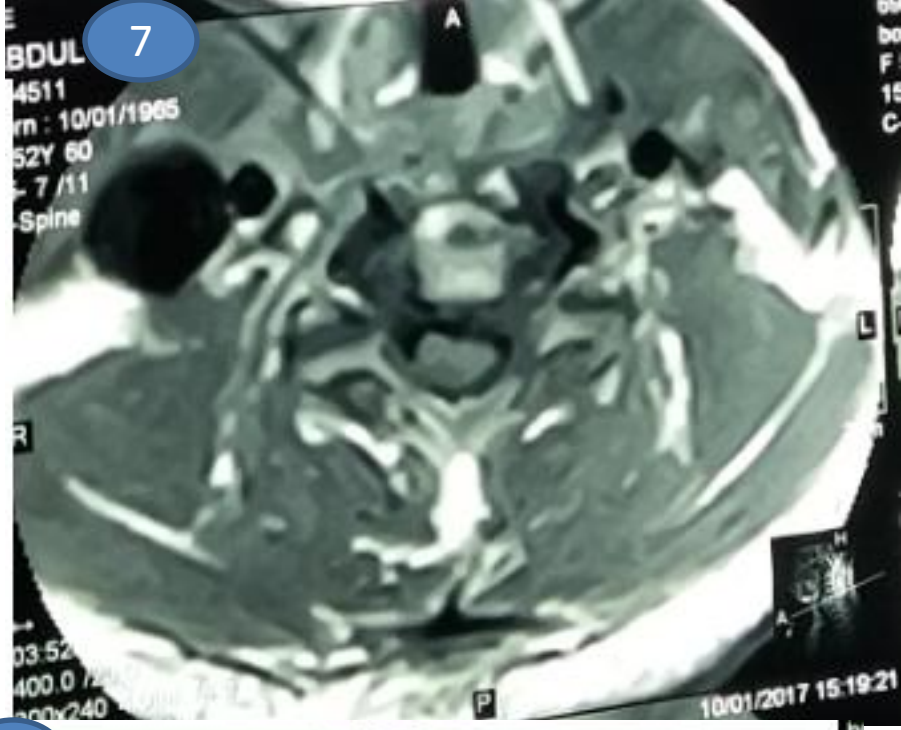

born 10/01/1965
F 52Y 60
C-Spine
Dr shamol
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
F +2.03(R)
AIRIS_VentoLT
W 1000
L 500

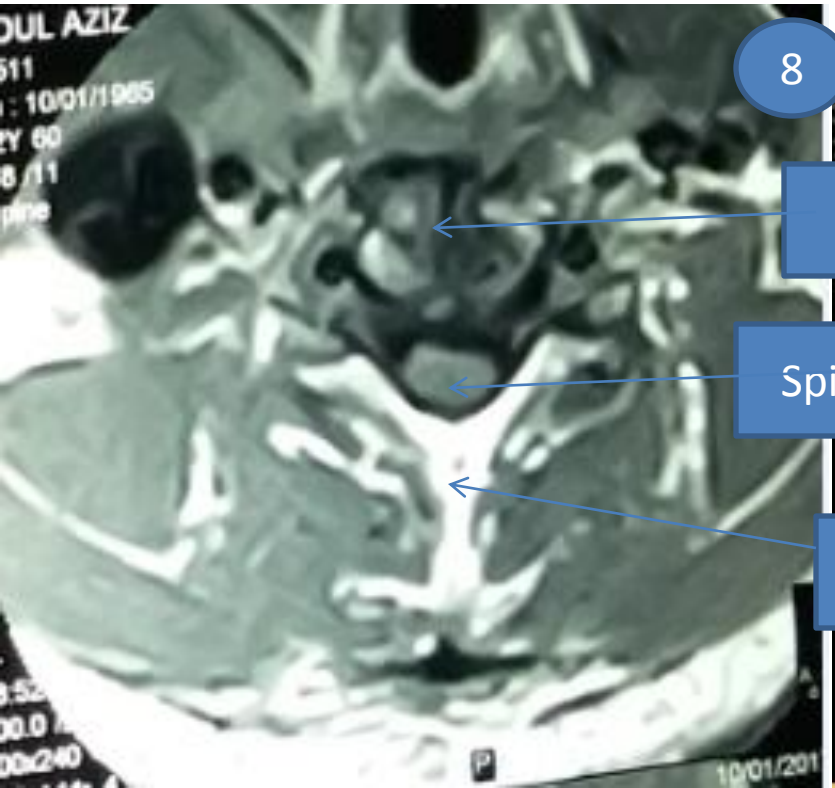

4
03:52
400.0 /20.0
300x240 4.0thk
256x144r 4 512
3cm

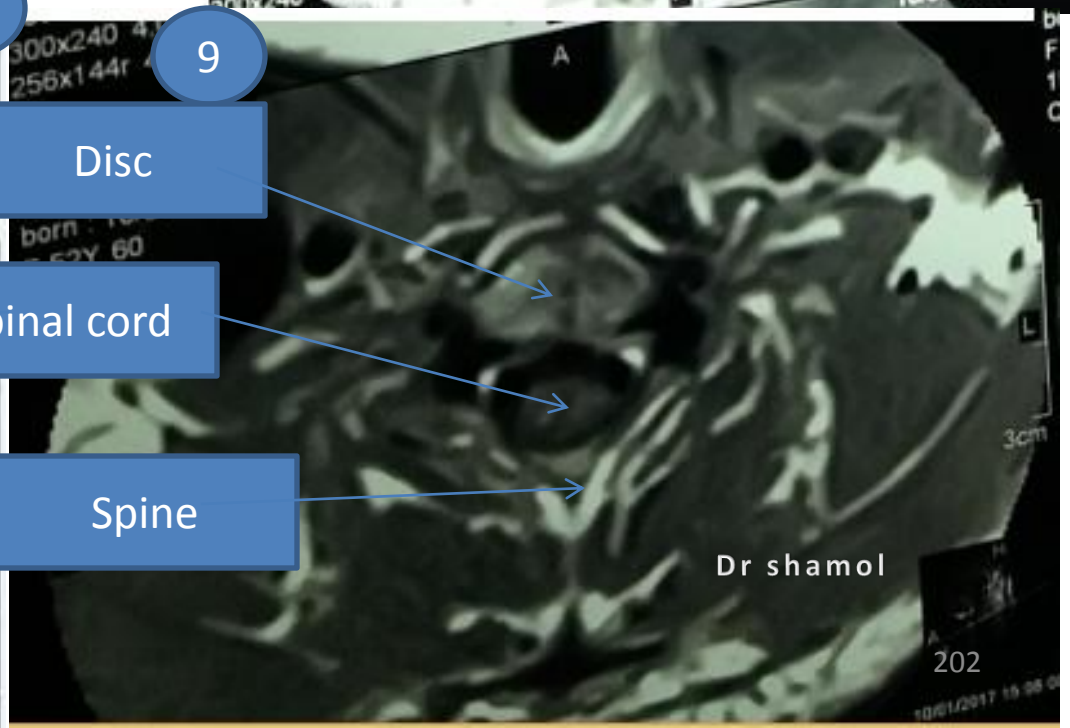

5
BDUL AZIZ
4511
C-Spine
3:52
00.0 /20.0
00x240 4.0thk
56x144r 4 512


6
256x144r 4 512
SE
C-Spine
Disc
Spinal cord
Spine
3cm
03:52
10/01/2017 15:19:21

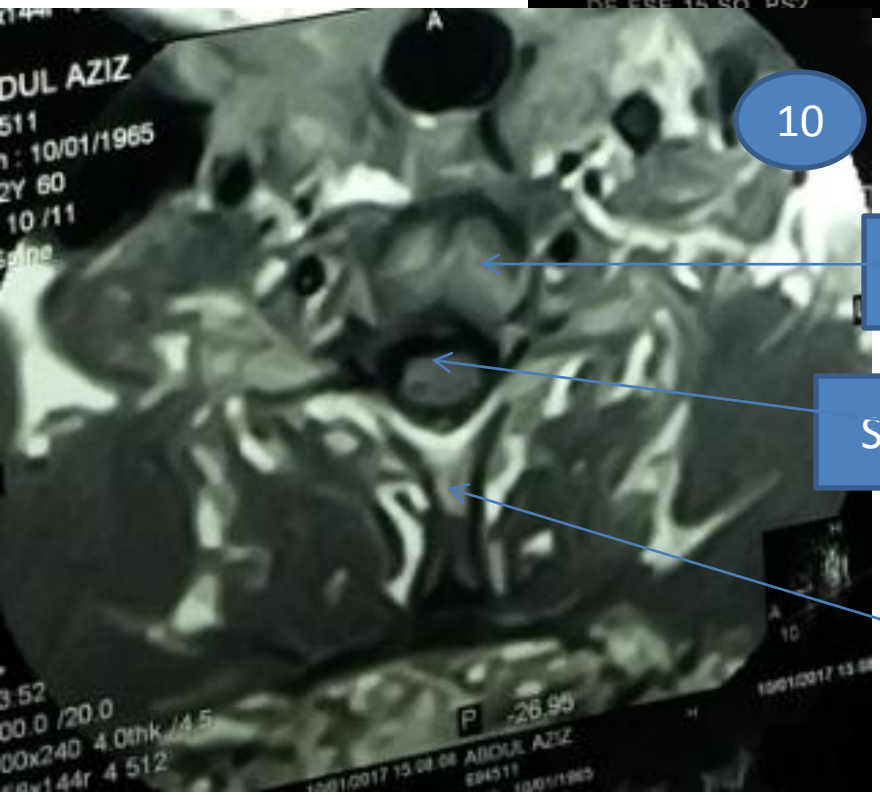

born 10/01/1965
F 52Y 60
C-Spine
5cm
03:07
2000.0 /120.0
FC
350x280 5.0thk /6.0
288x178r 4 512
DE FSE 15 SQ PS2
+2.03(R)
AIRIS_VentoLT

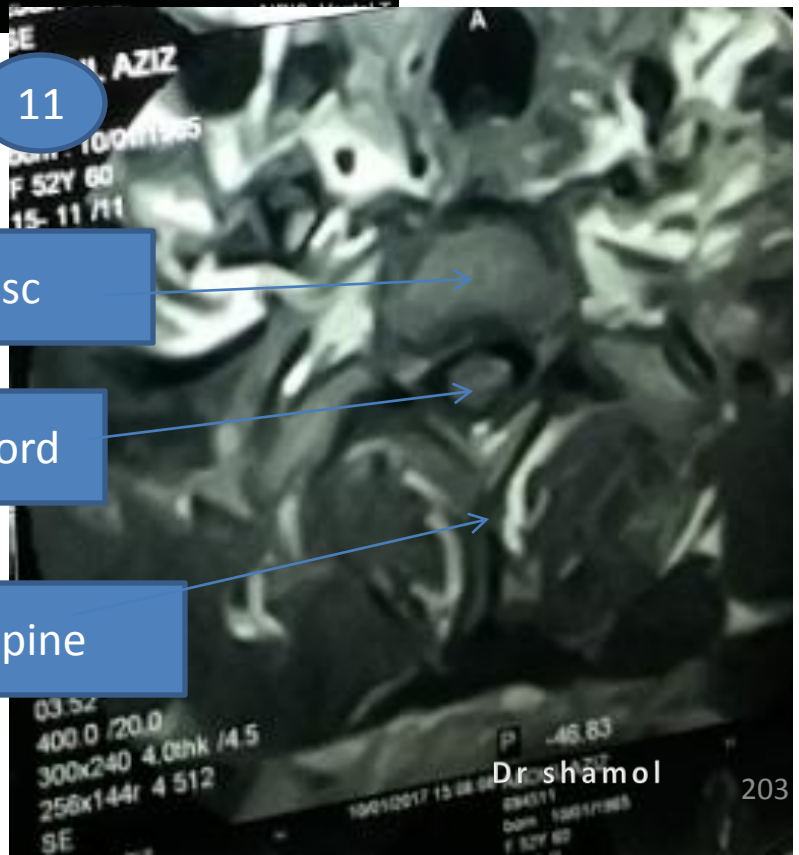

7
Spine
10/01/2017 15:19:21


8


9
Disc
Spinal cord
Spine
Dr shamol
3cm



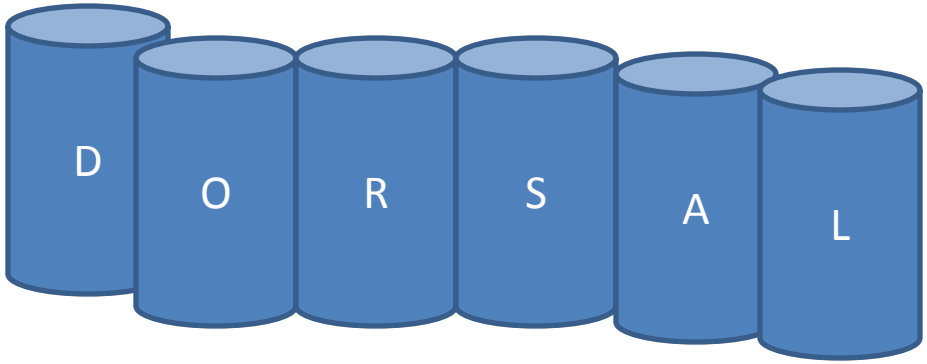


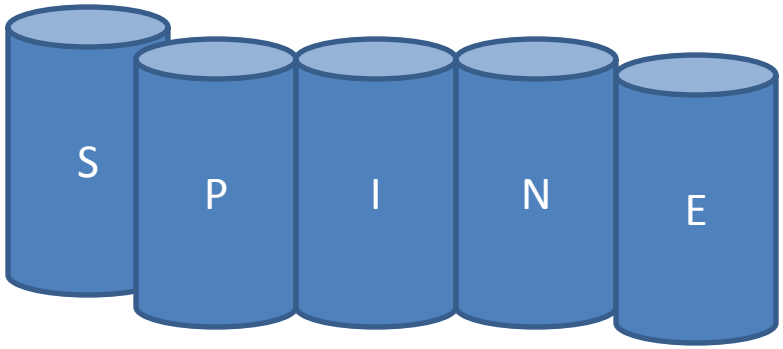


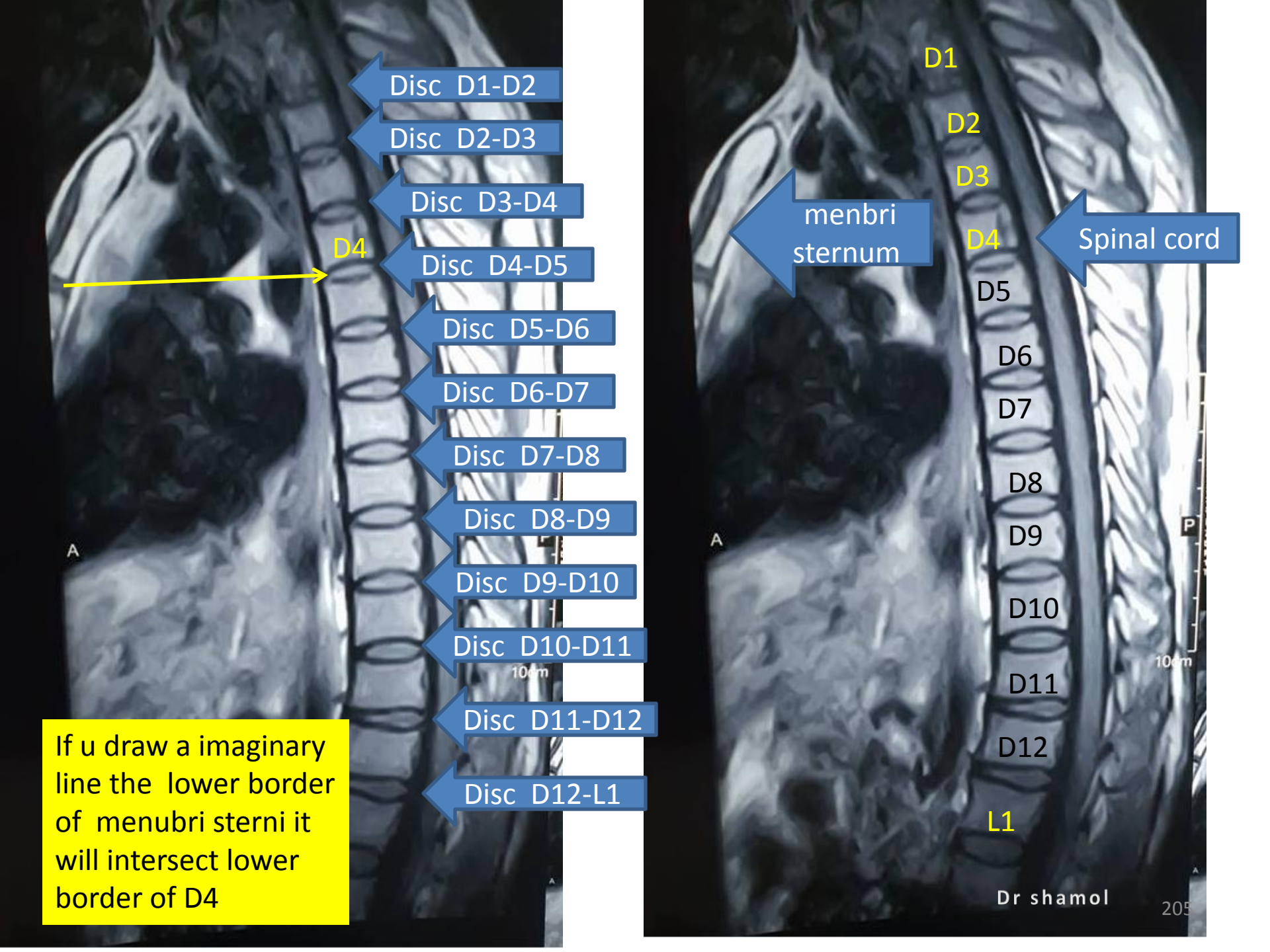
Disc

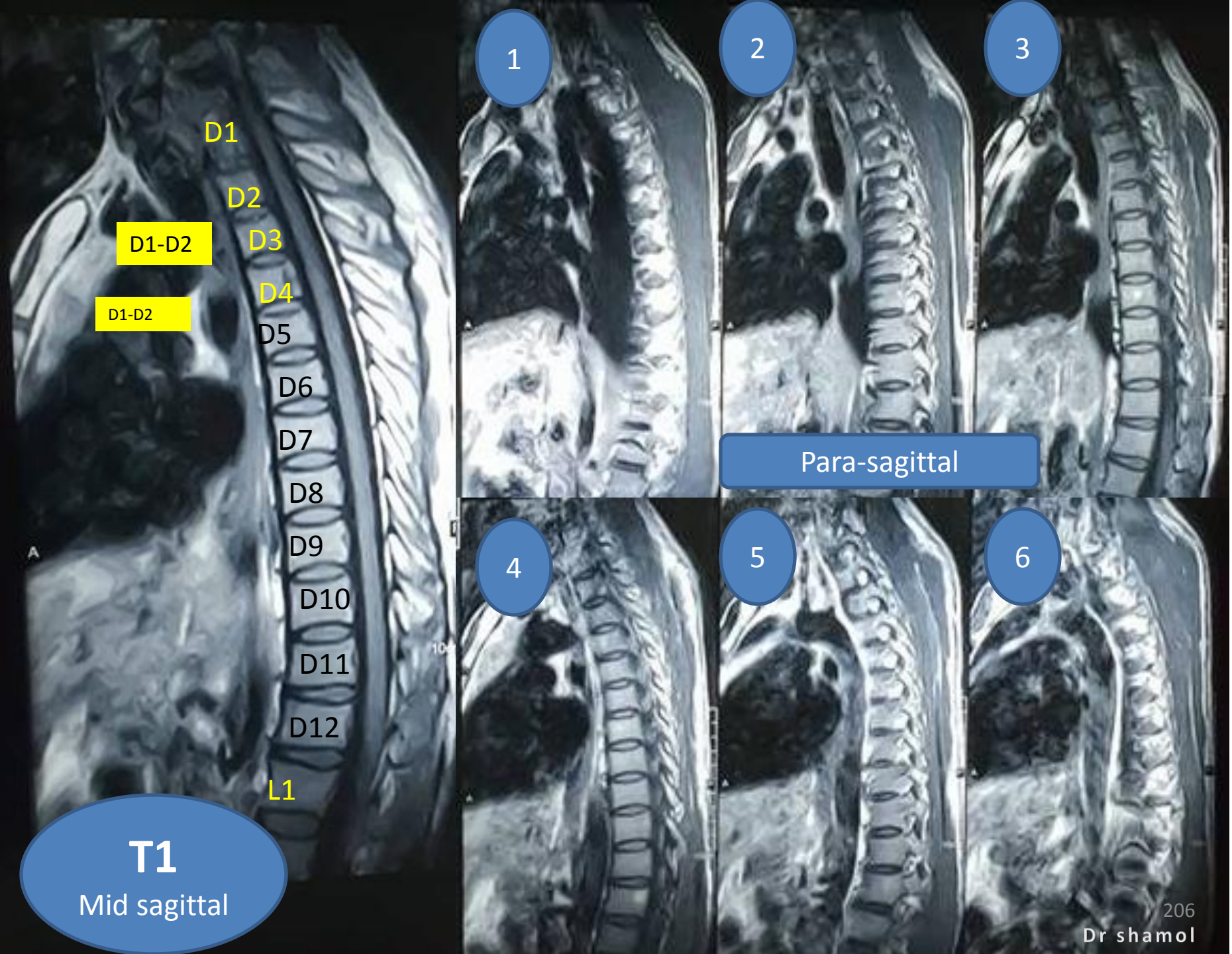
Spinal cord

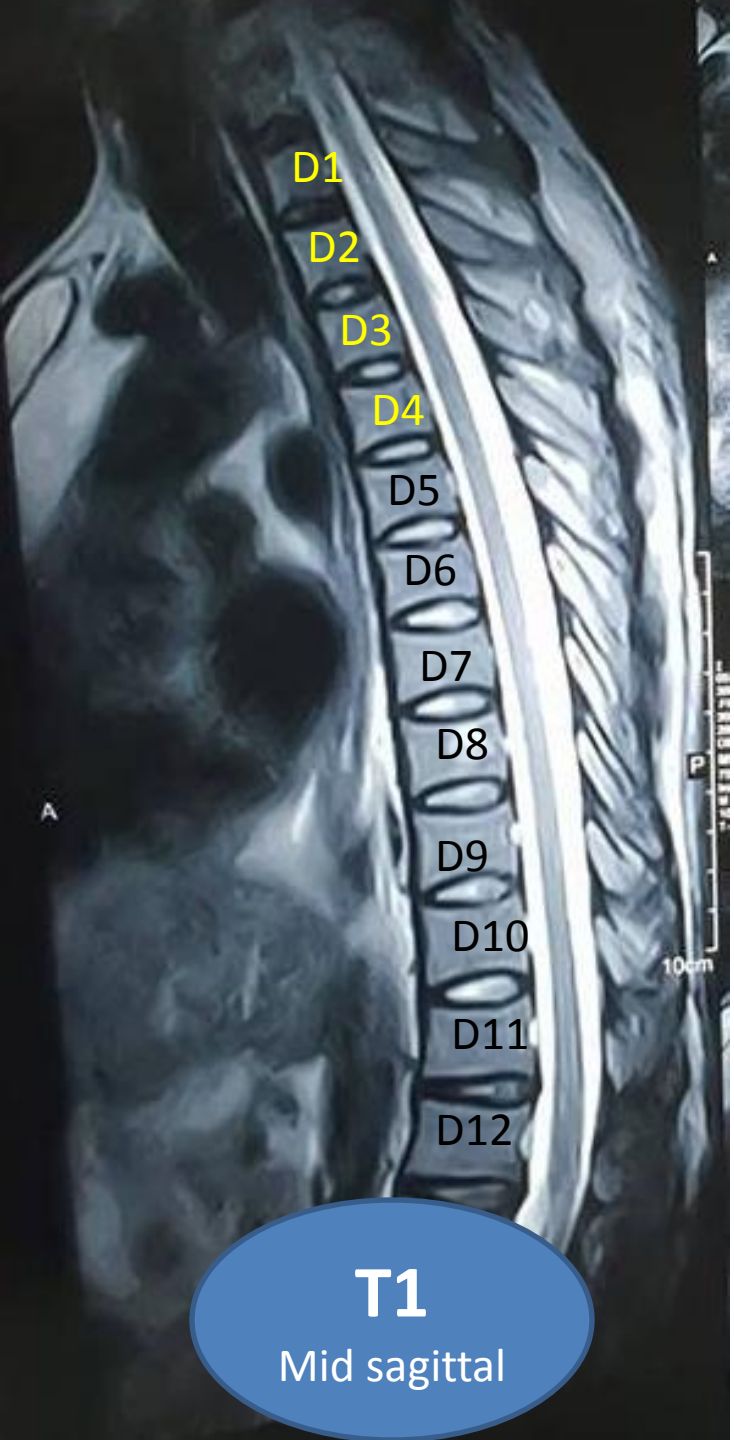
Spine


D
O
R
S
A
L


S
P
I
N
E

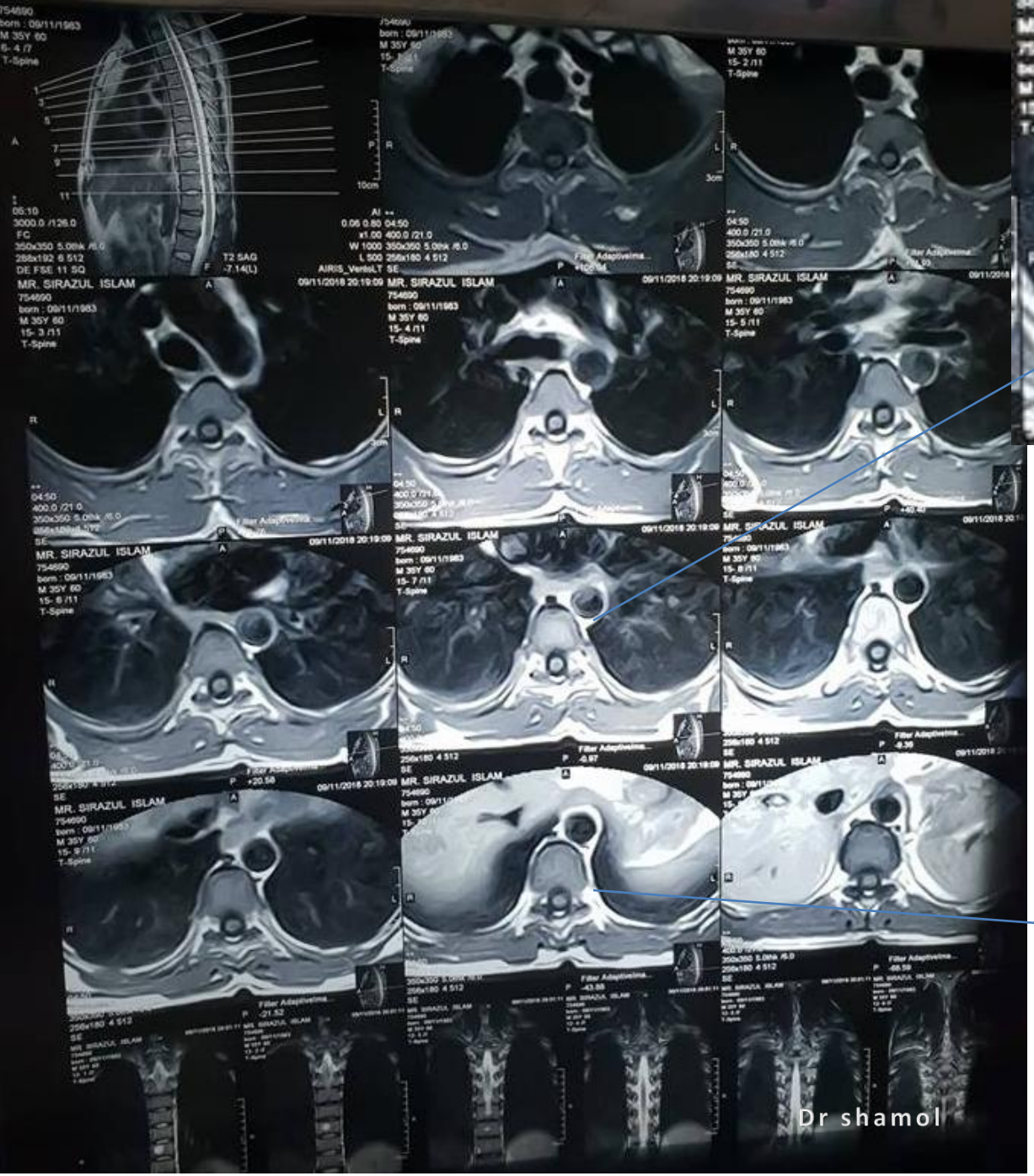

Disc D1-D2
Disc D2-D3
Disc D3-D4
D4
Disc D4-D5
Disc D5-D6
Disc D6-D7
Disc D7-D8
Disc D8-D9
Disc D9-D10
Disc D10-D11
Disc D11-D12
Disc D12-L1
If u draw a imaginary line the lower border of menubri sterni it will intersect lower border of D4
D1
D2
D3
menbri sternum
D4
Spinal cord
D5
D6
D7
D8
D9
D10
D11
D12
L1
Dr shamol

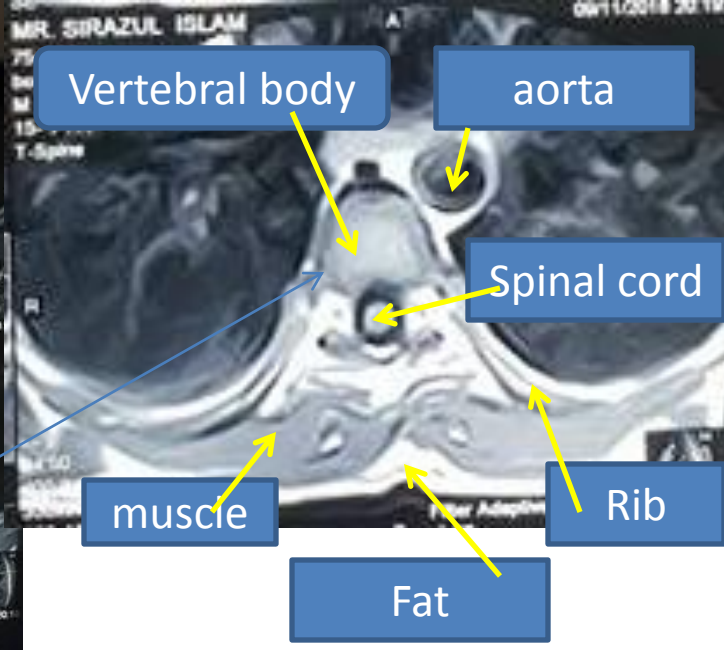

D1
D2
D1-D2
D3
D4
D1-D2
D5
D6
D7
D8
D9
D10
D11
D12
L1
T1
Mid sagittal
1
2
3
Para-sagittal
4
5
6
206
Dr shamol

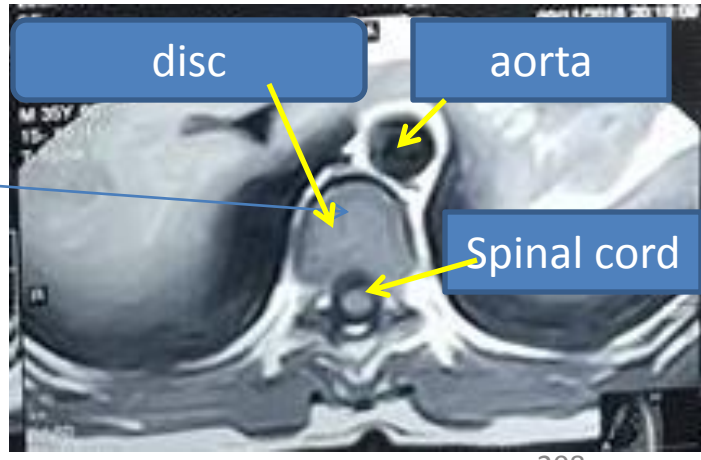

D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
T1
Mid sagittal


1
2
3
Para-sagittal

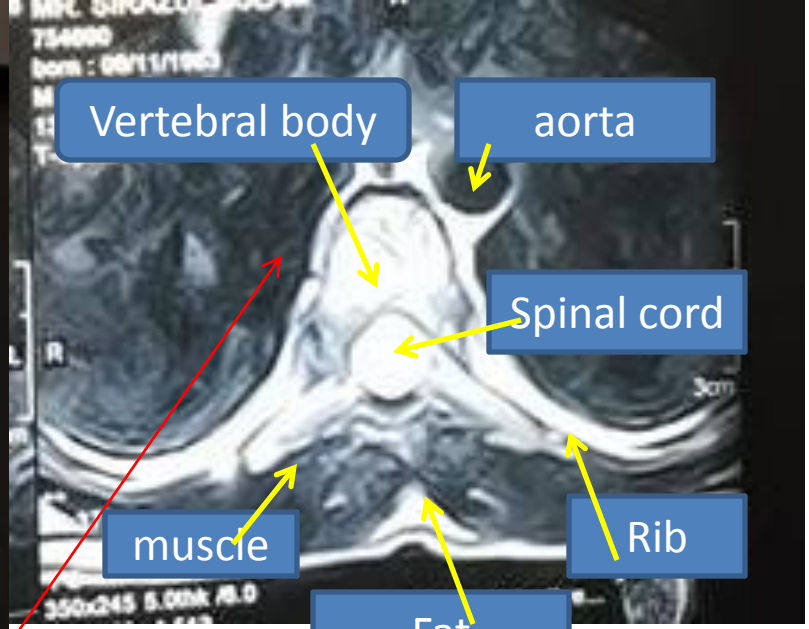

4
5
6
Dr shamol

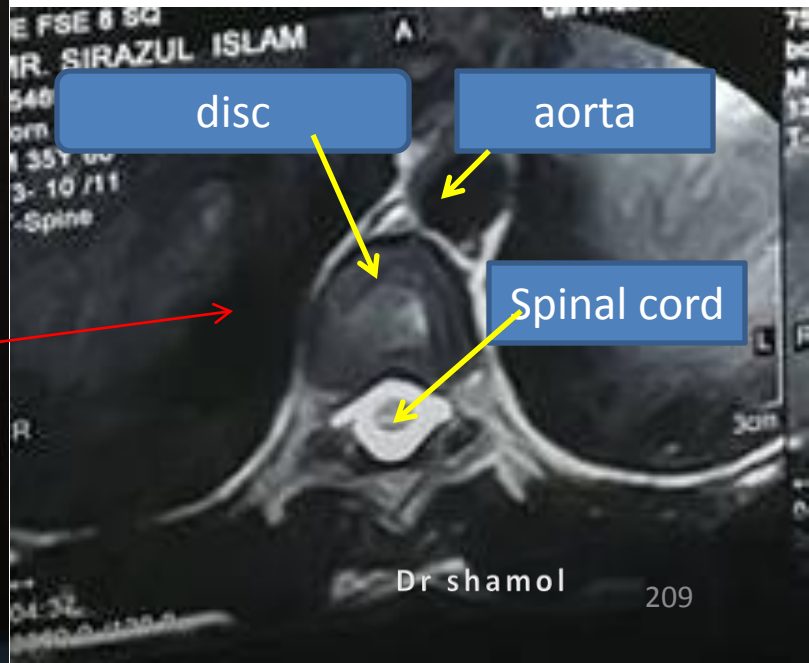

MR. SIRAZUL ISLAM
Dr shamol


Vertebral body
aorta
Spinal cord
muscle
Rib
Fat

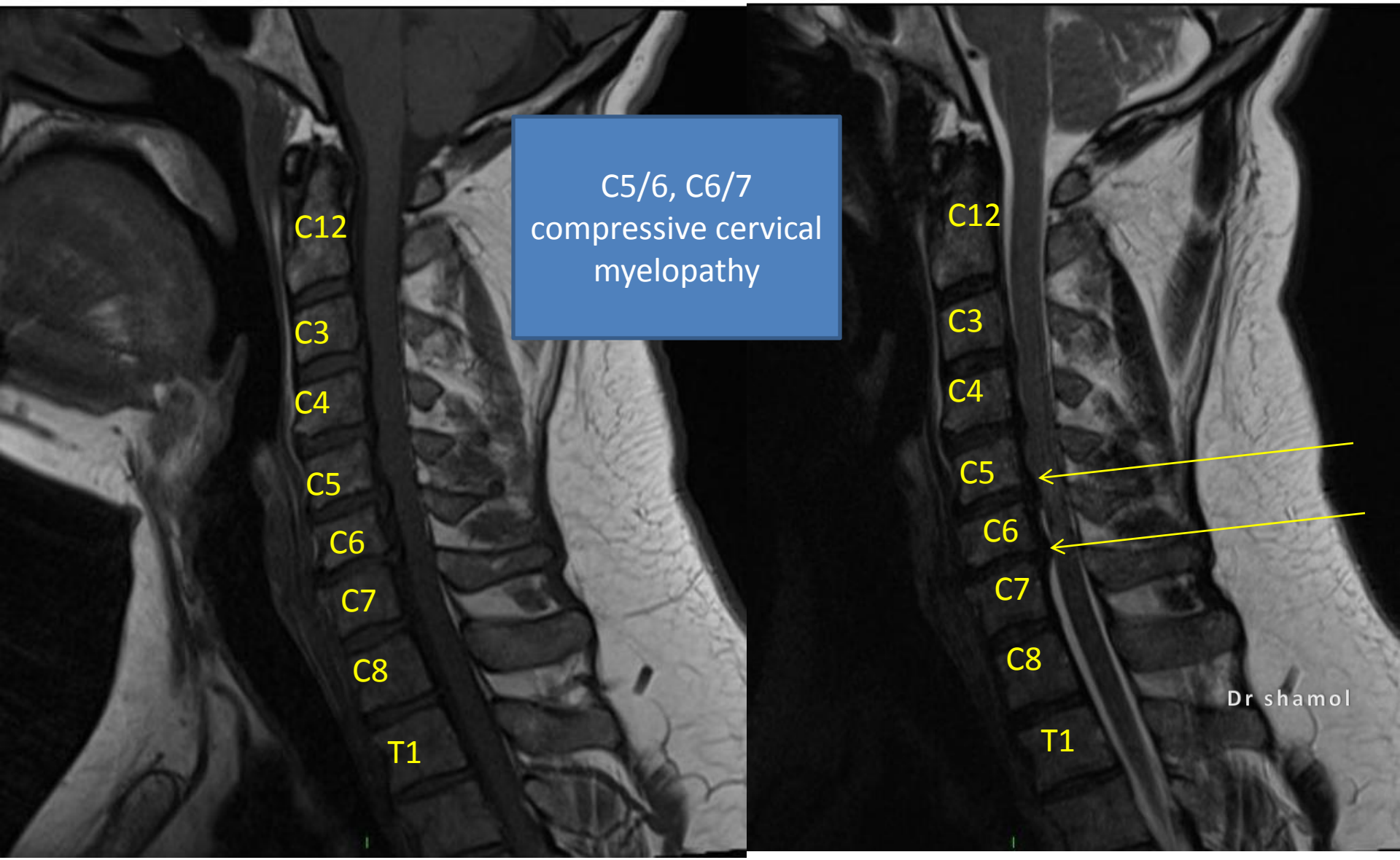

disc
aorta
Spinal cord



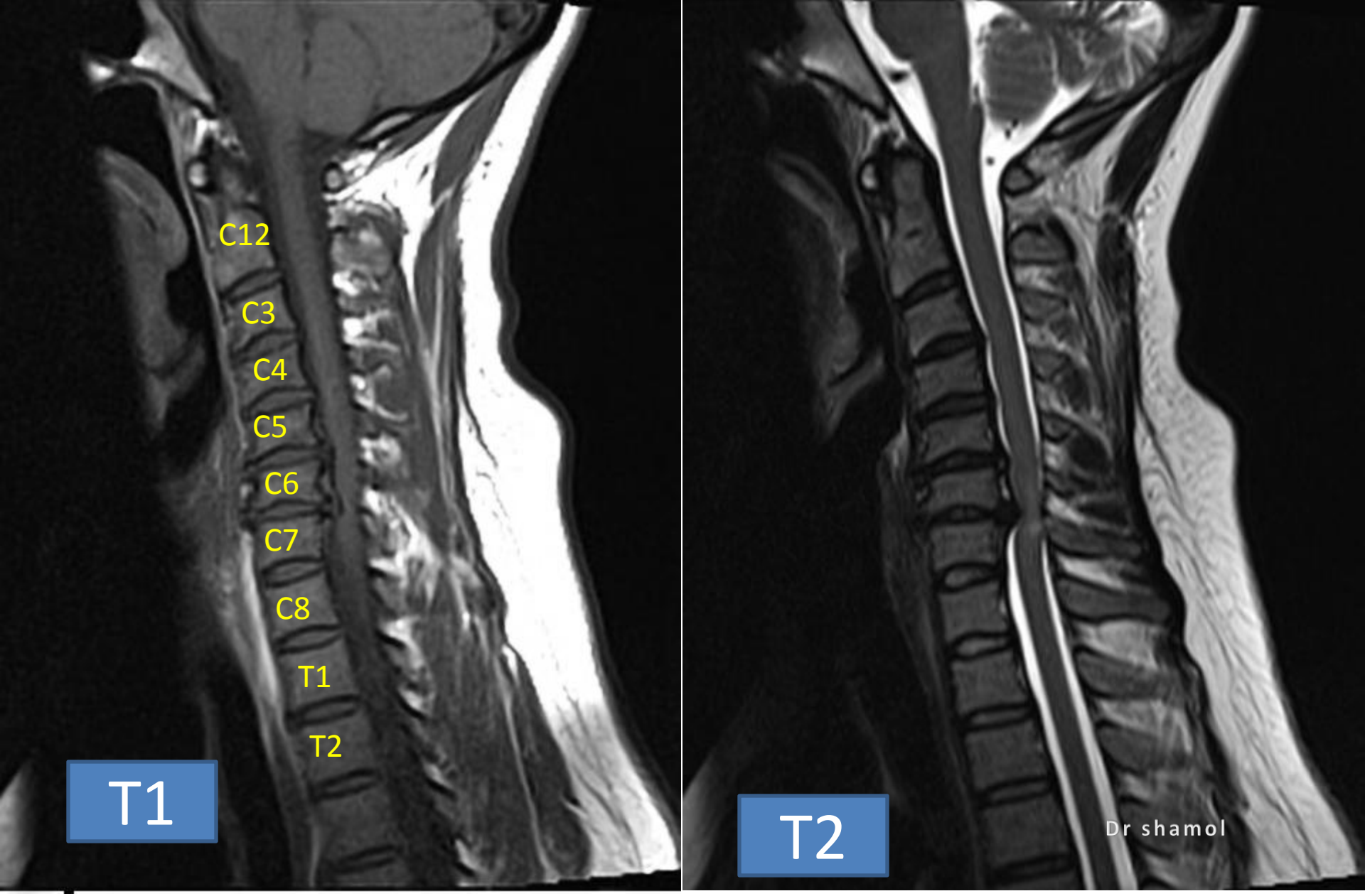

Vertebral body
aorta
Spinal cord
muscle
Rib
Fat


disc
aorta
Spinal cord

Compressive myelopathy

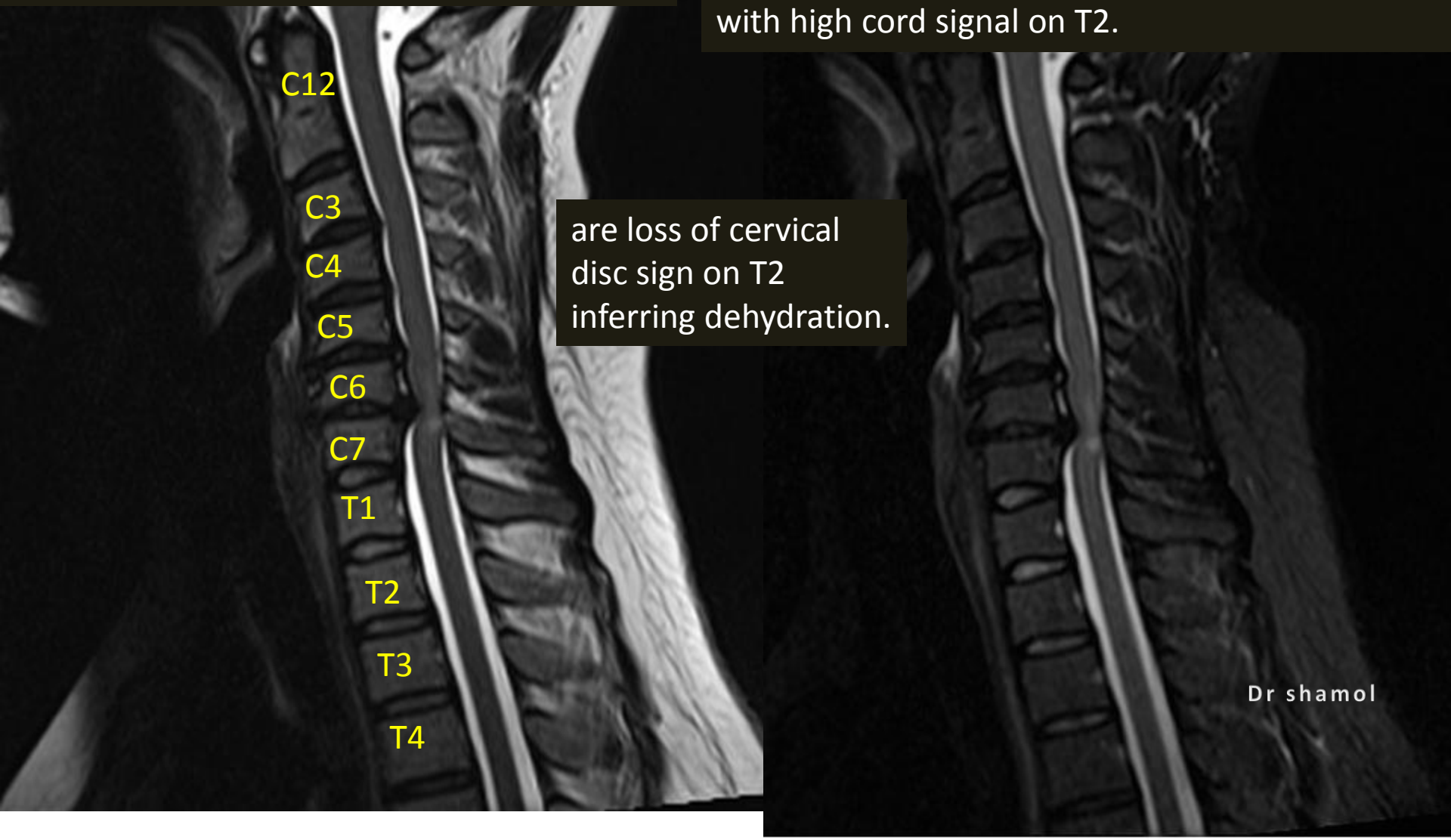


Severe spinal canal stenosis noted from C4 to C7 particularly at C5/6 and C6/7 due to degenerative disc bulges and congenitally narrow spinal canal which resulting in complete effacement of the CSF and spinal cord compression at these levels.

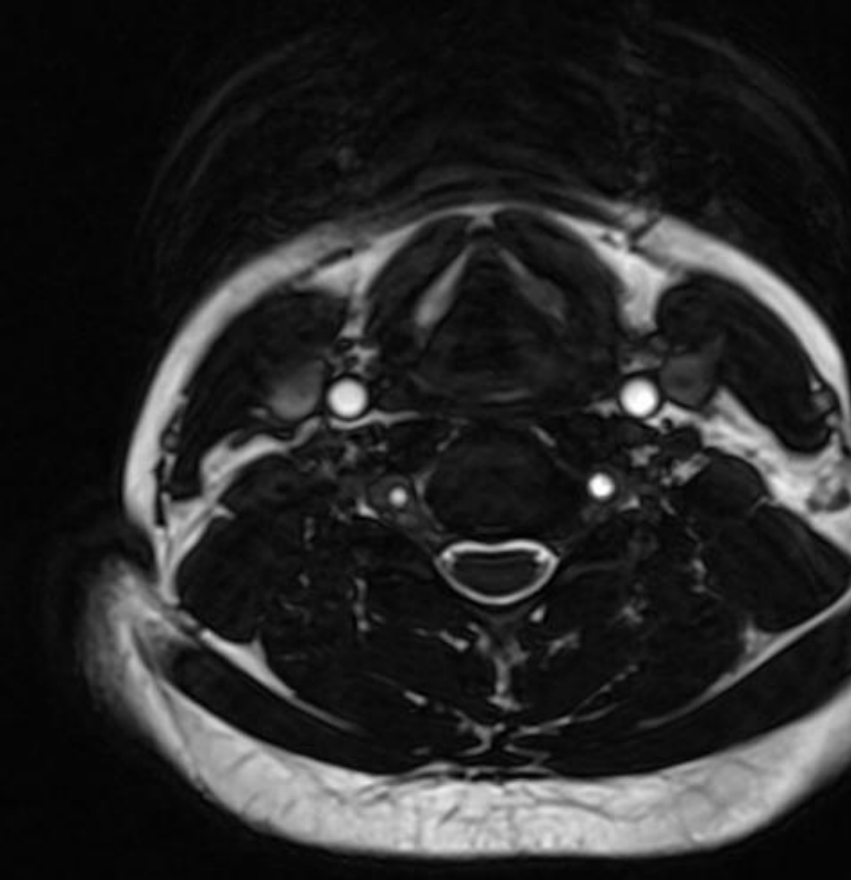

C12
C3
C4
C5
C6
C7
C8
T1
T2
T1
T2
Dr shamol

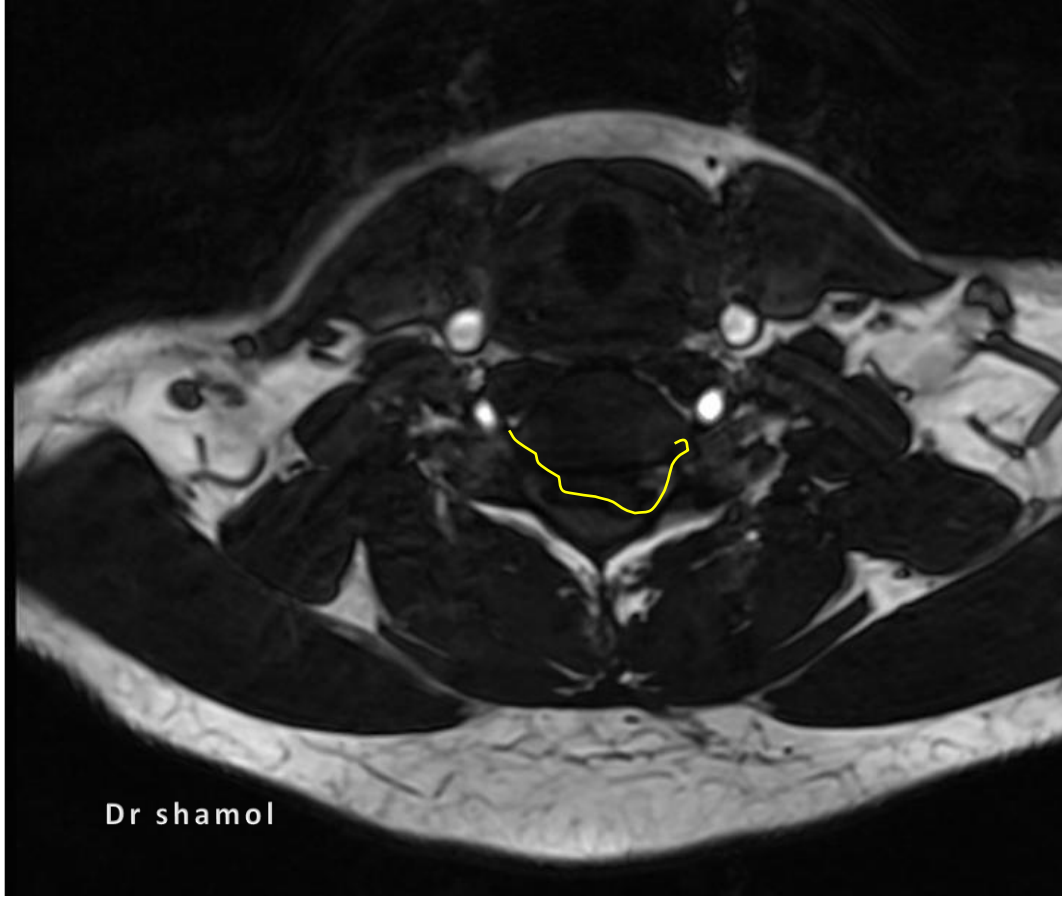
C5/6: disc protrusion indents the spinal cord anteriorly, with normal cord signal maintained.

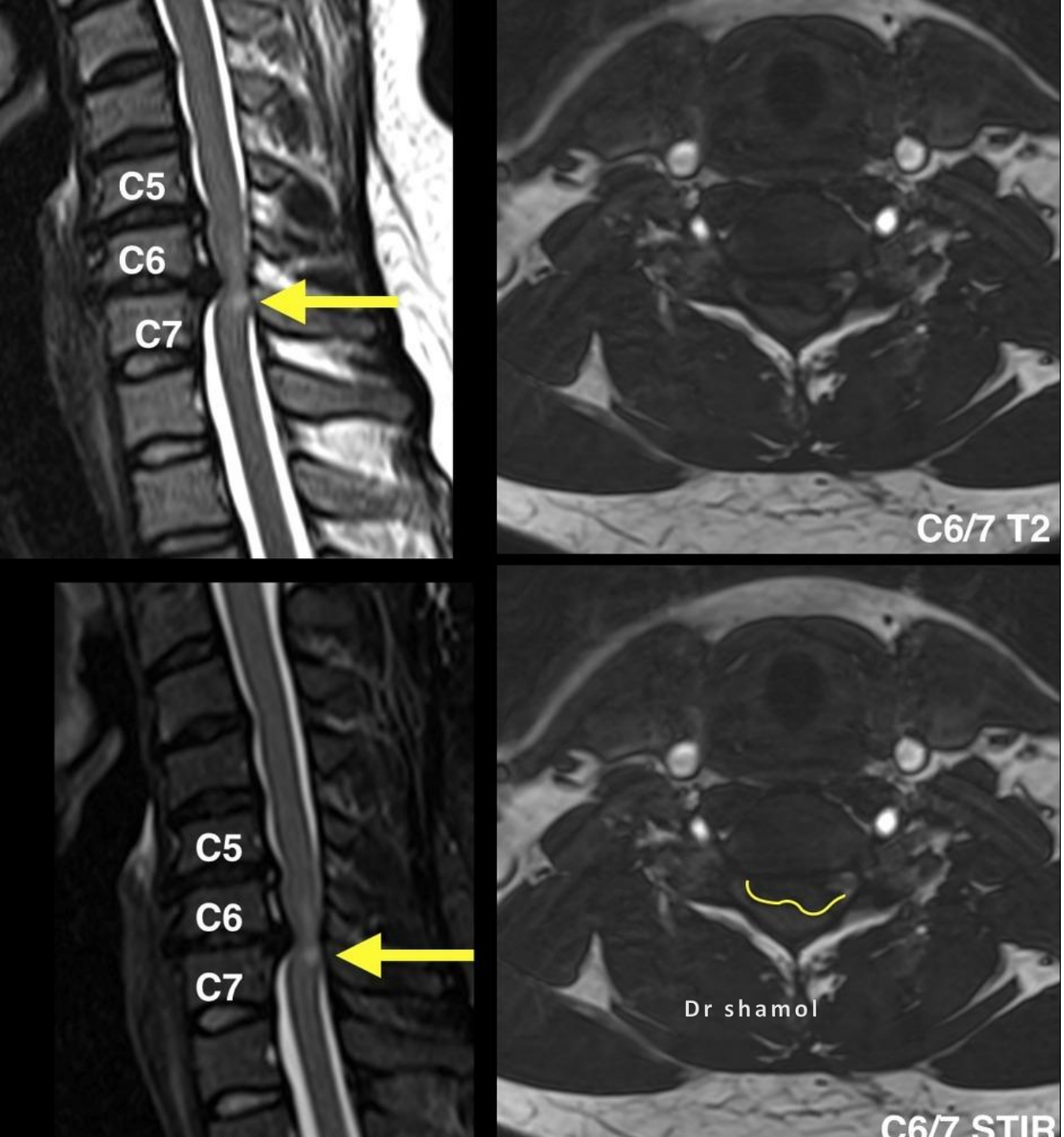
C6/7: central disc protrusion indents the spinal cord anteriorly, especially with a left paramedian disc extrusion component, associated with high cord signal on T2.

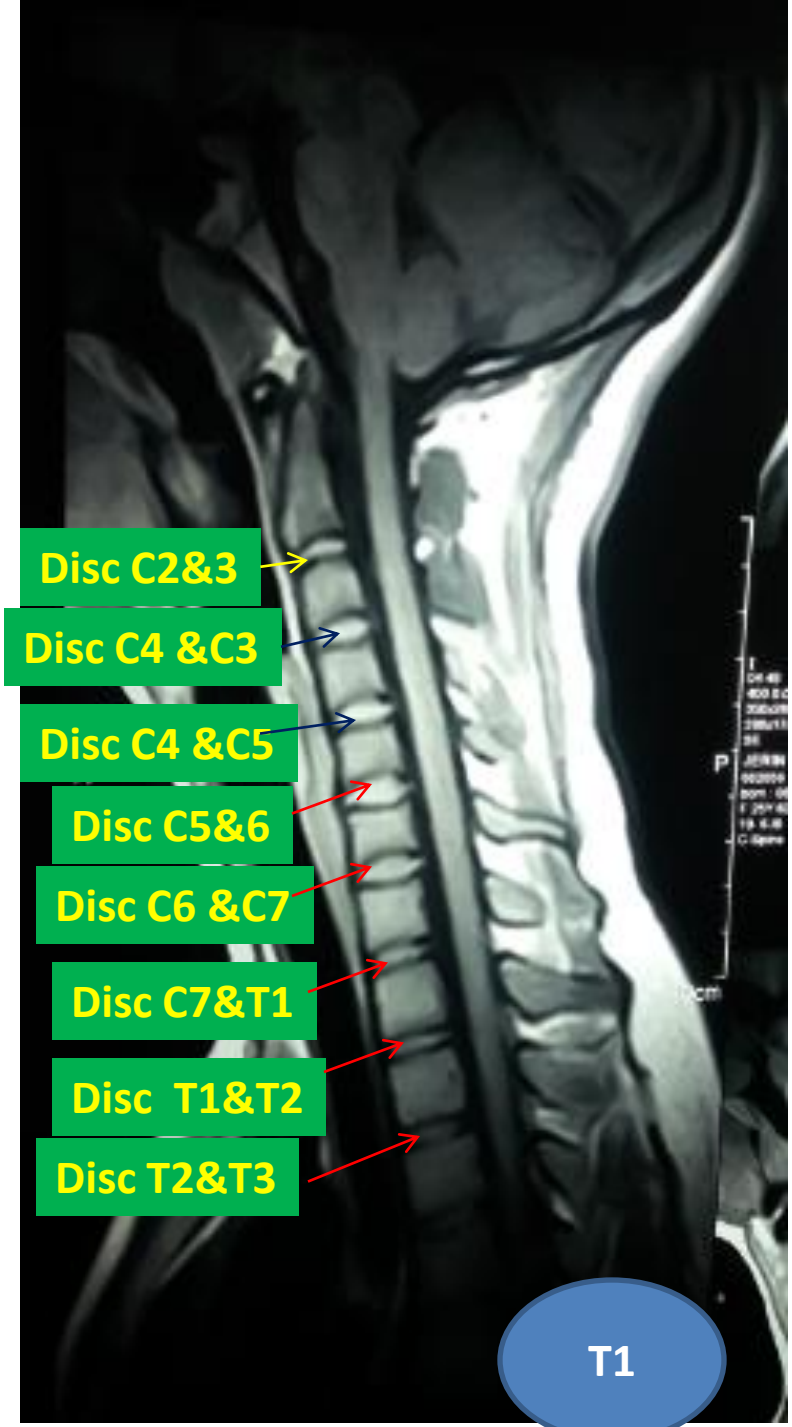


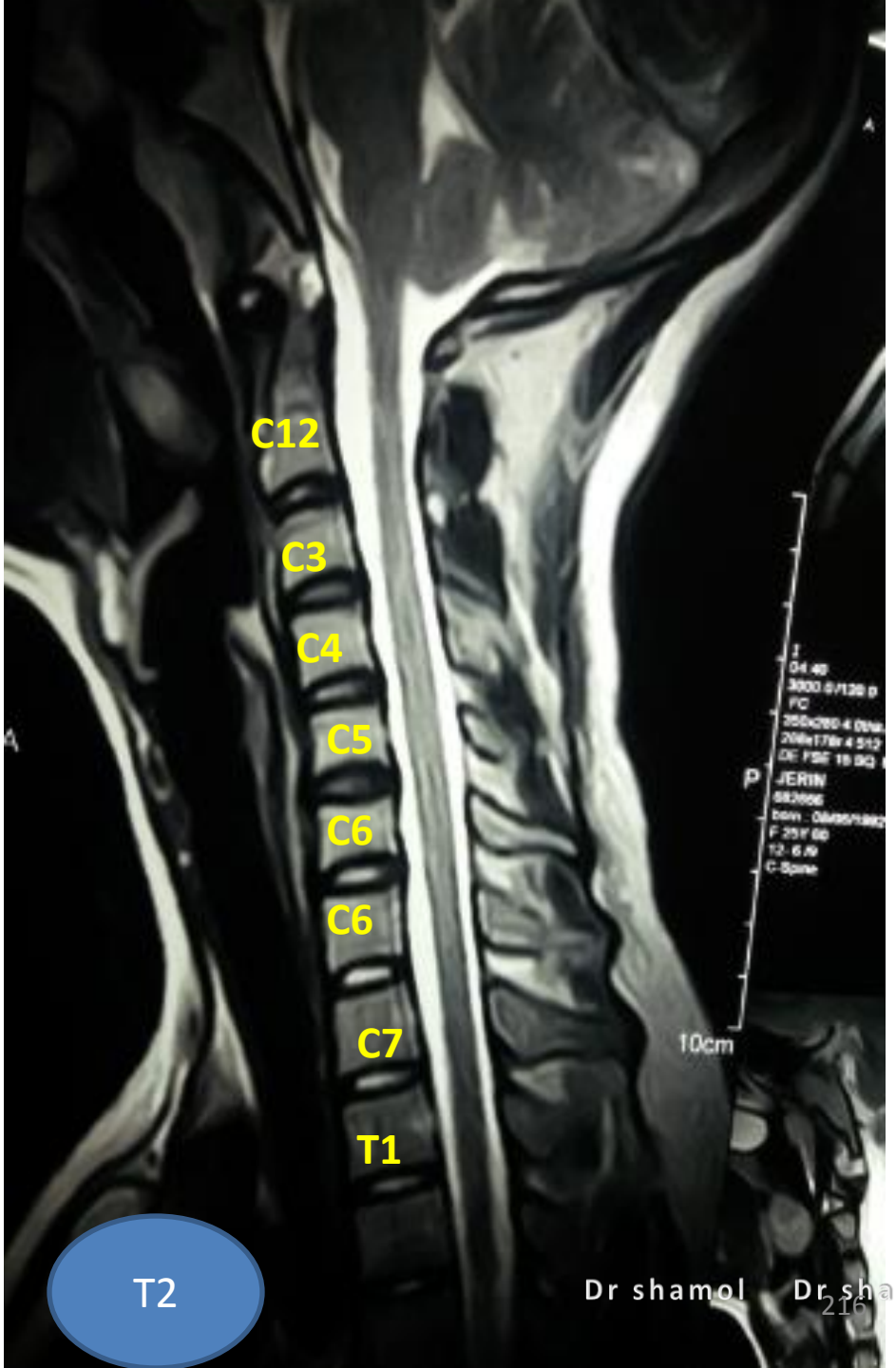
are loss of cervical disc sign on T2 inferring dehydration.



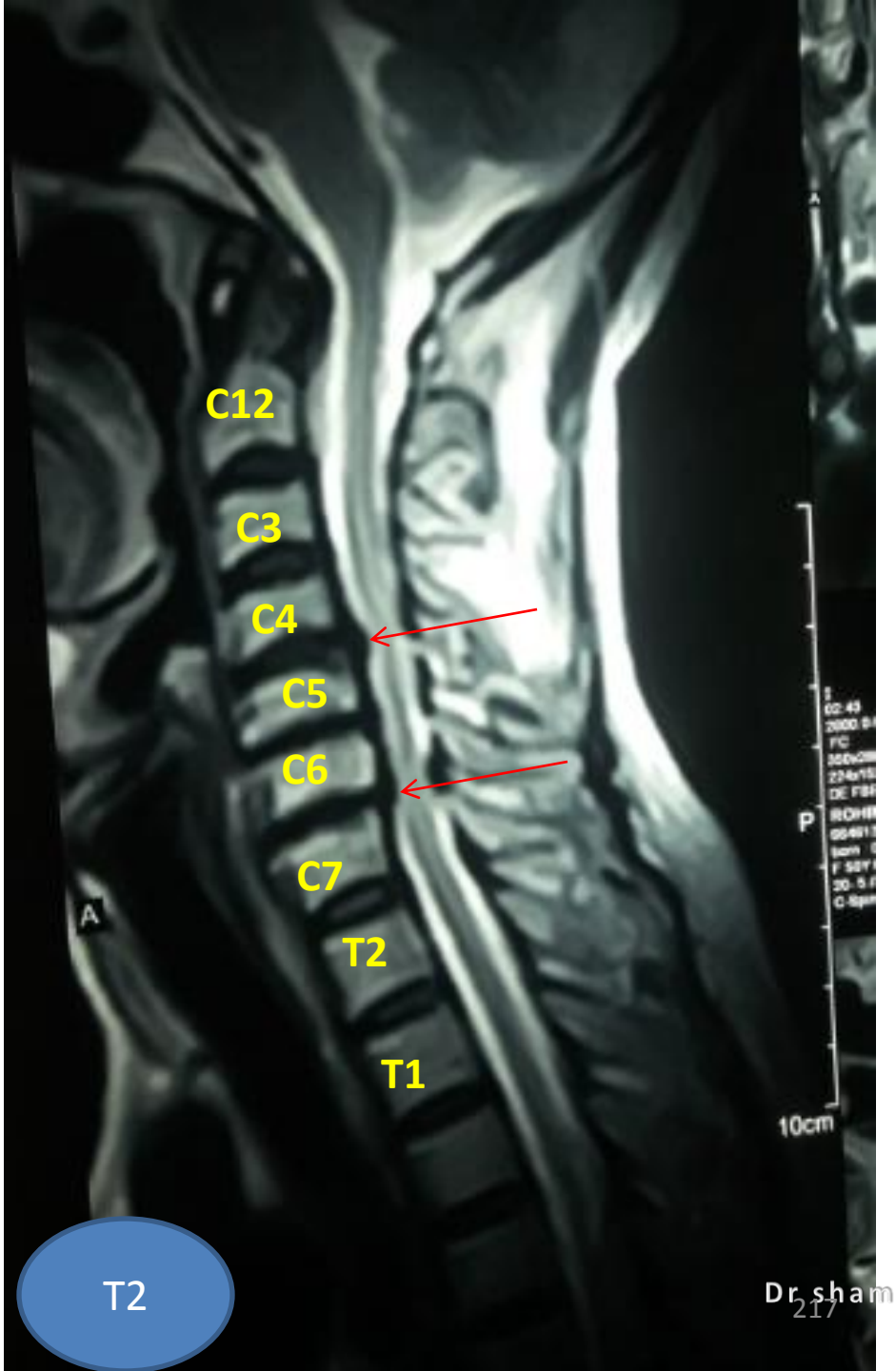

Dr shamol


C5
C6
C7
C6/7 T2
C5
C6
C7
Dr shamol
C6/7 STIR

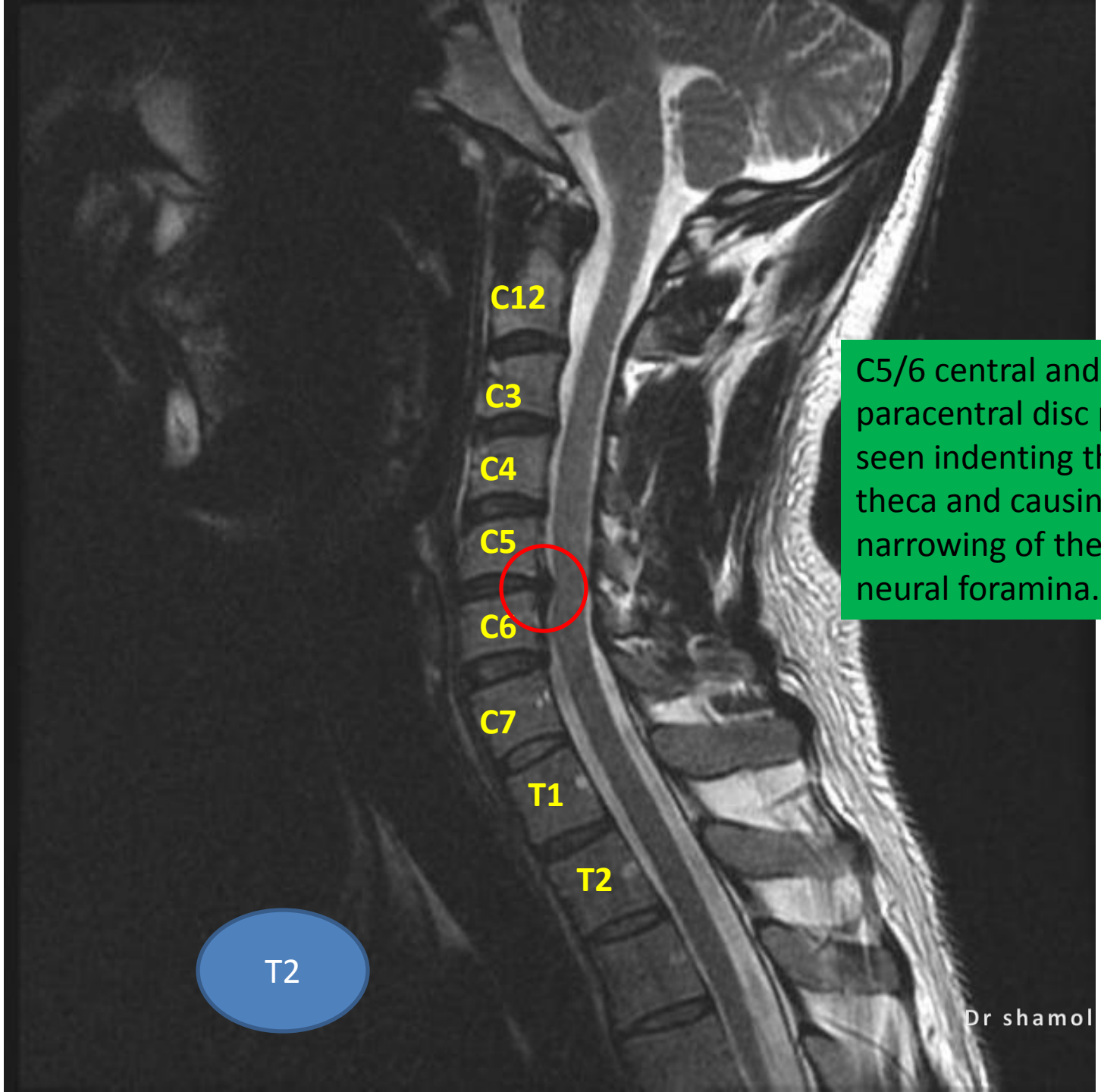

Disc C2&3
Disc C4 &C3
Disc C4 &C5
Disc C5&6
Disc C6 &C7
Disc C7&T1
Disc T1&T2
Disc T2&T3
T1


C12
C3
C4
C5
C6
C6
C7
T1
T2
Dr shamol
Dr shamol



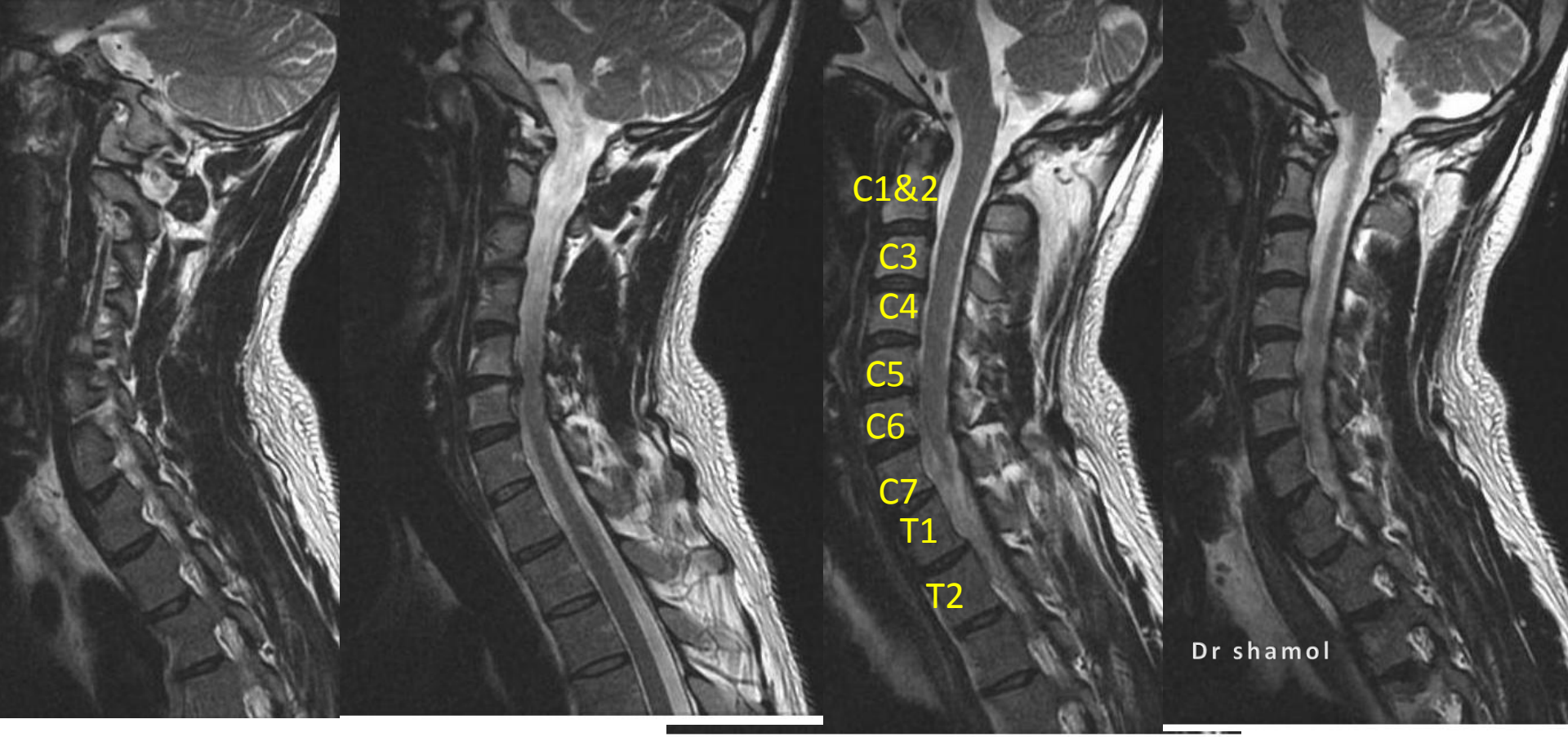


Dr shamol



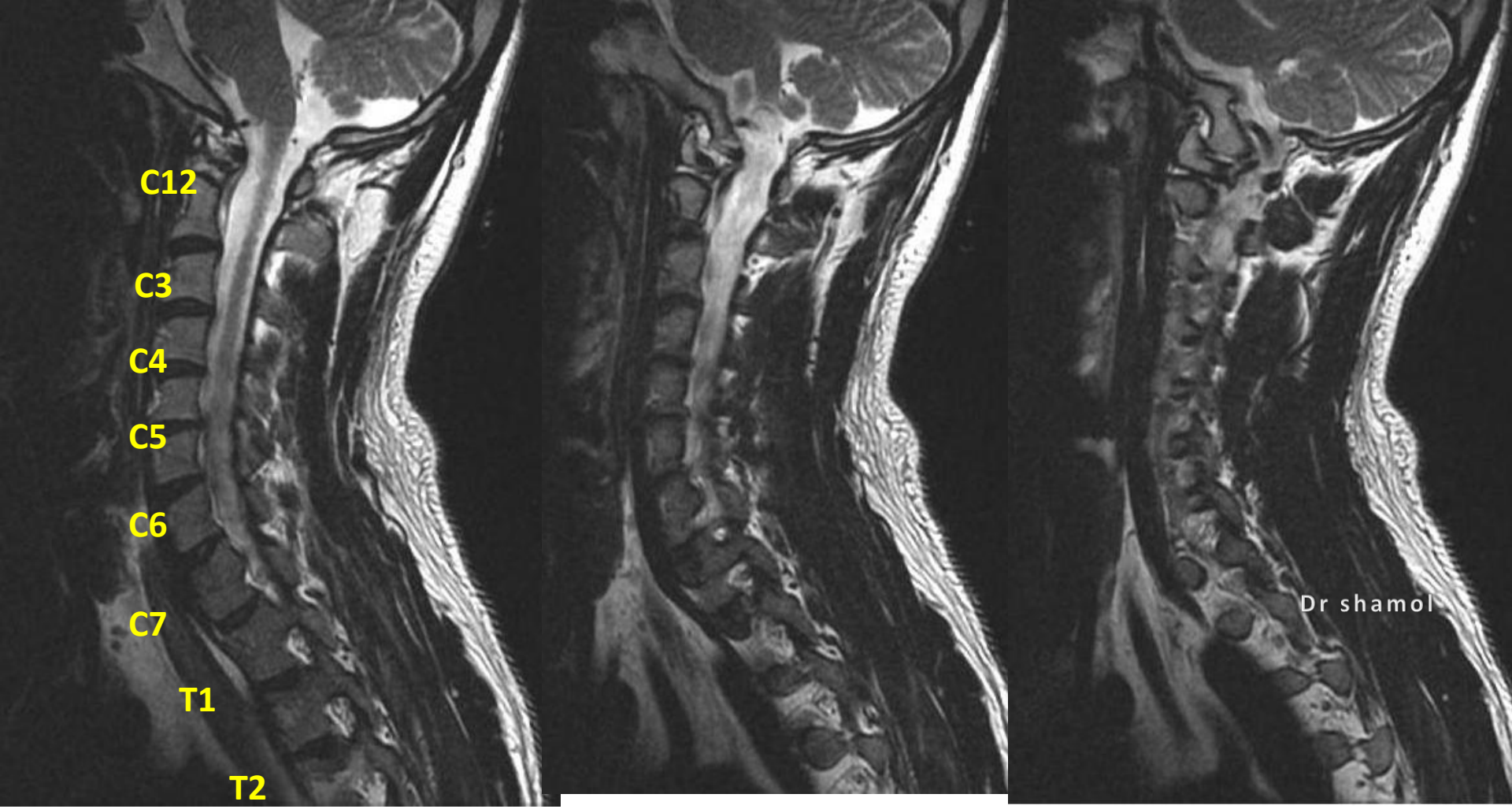
C5/6 central and right paracentral disc protrusion seen indenting the ventral theca and causing mild narrowing of the right exiting neural foramina.

Dr shamol



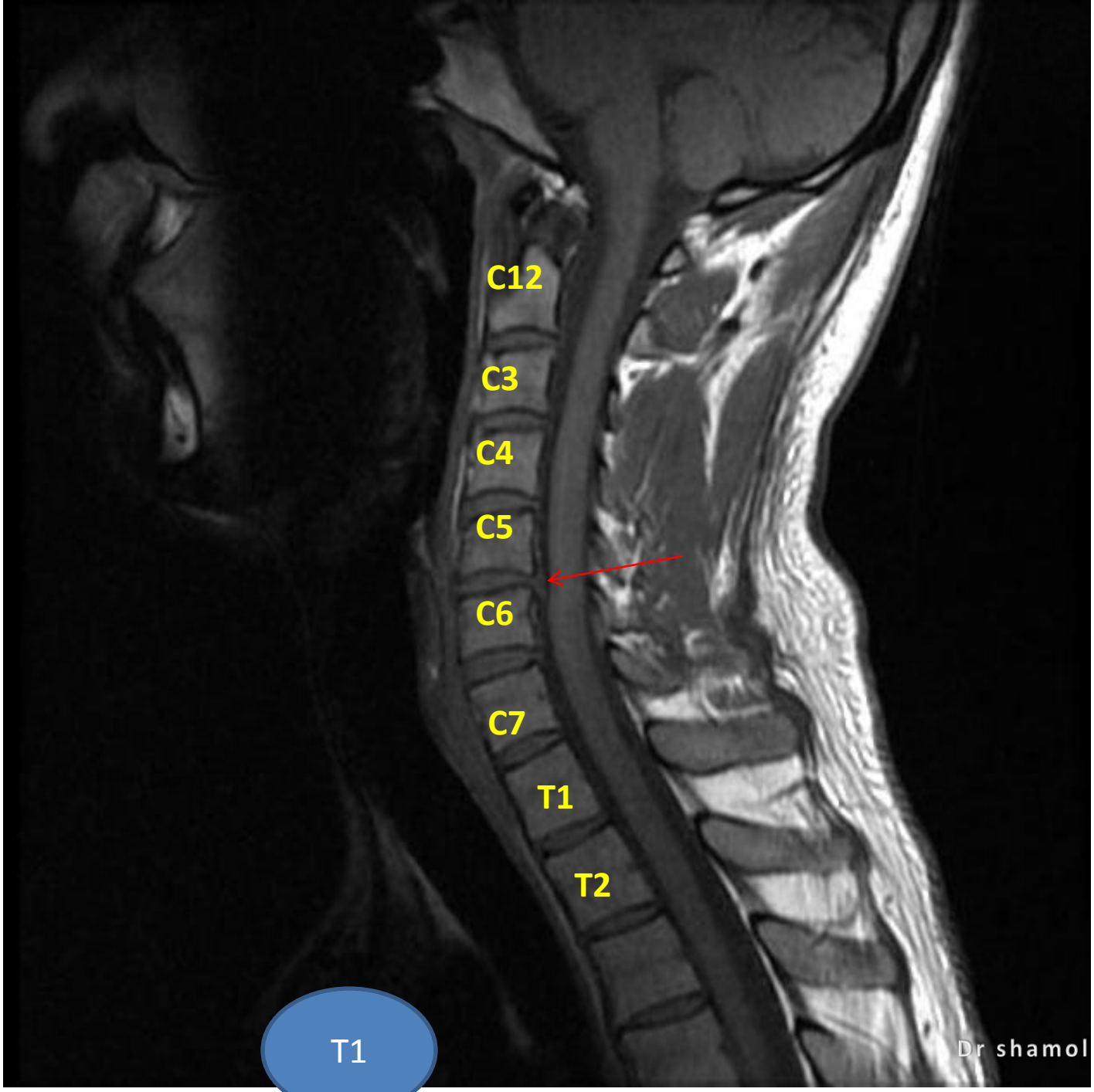
T2

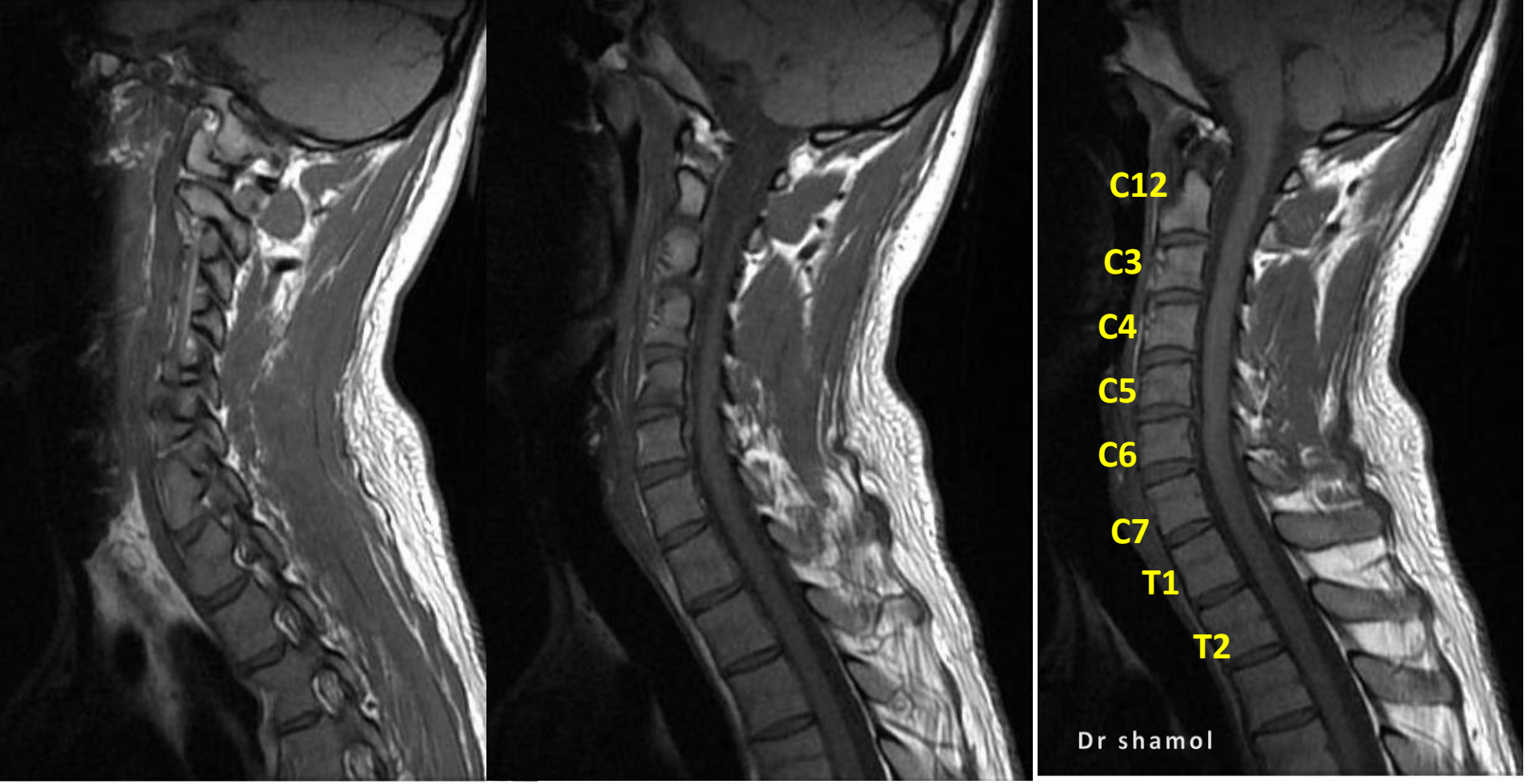
Dr shamol



T2

Dr shamol


C12
C3
C4
C5
C6
C7
T1
T2
T1
Dr shamol
Dr shamol



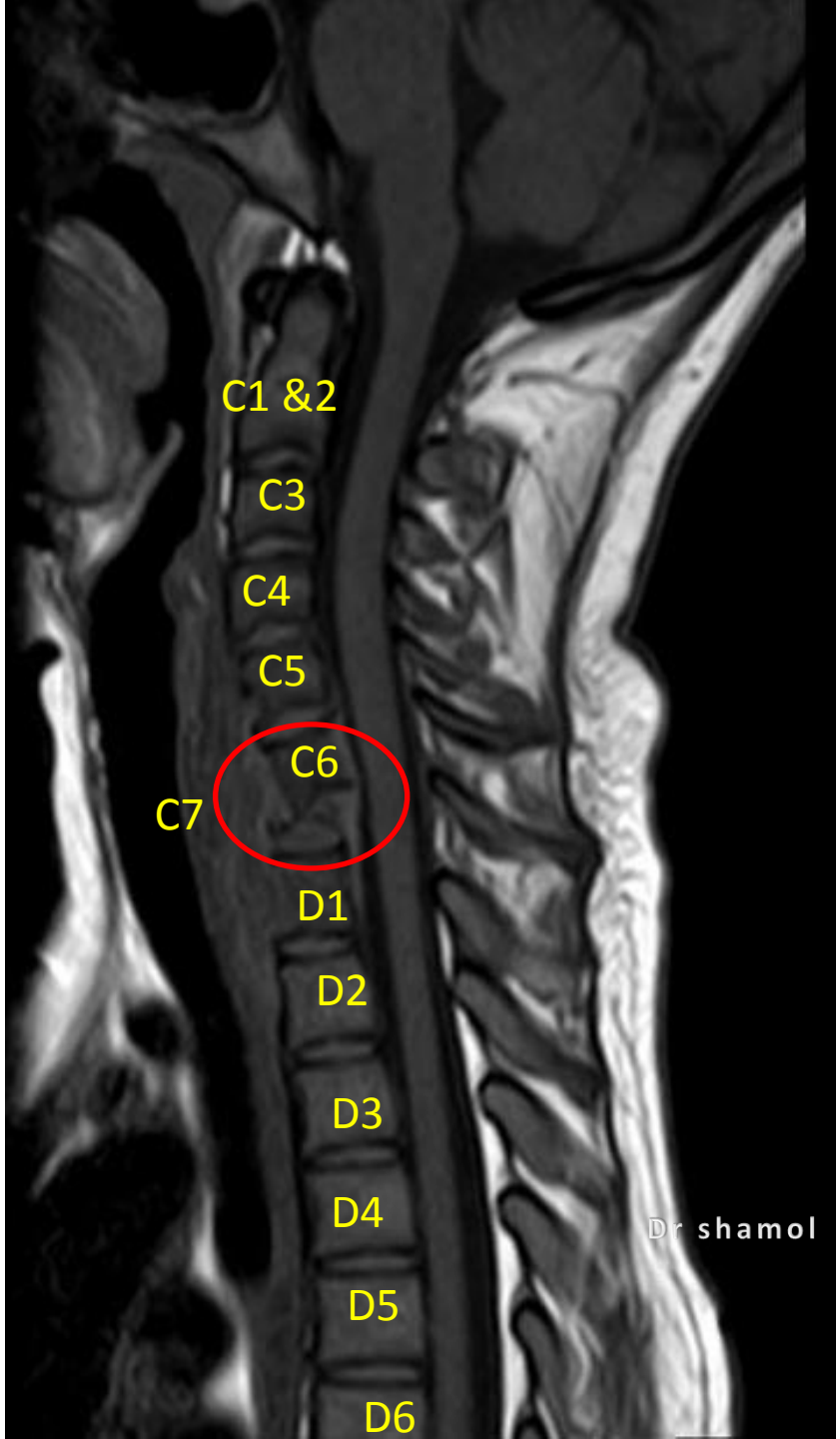
T1



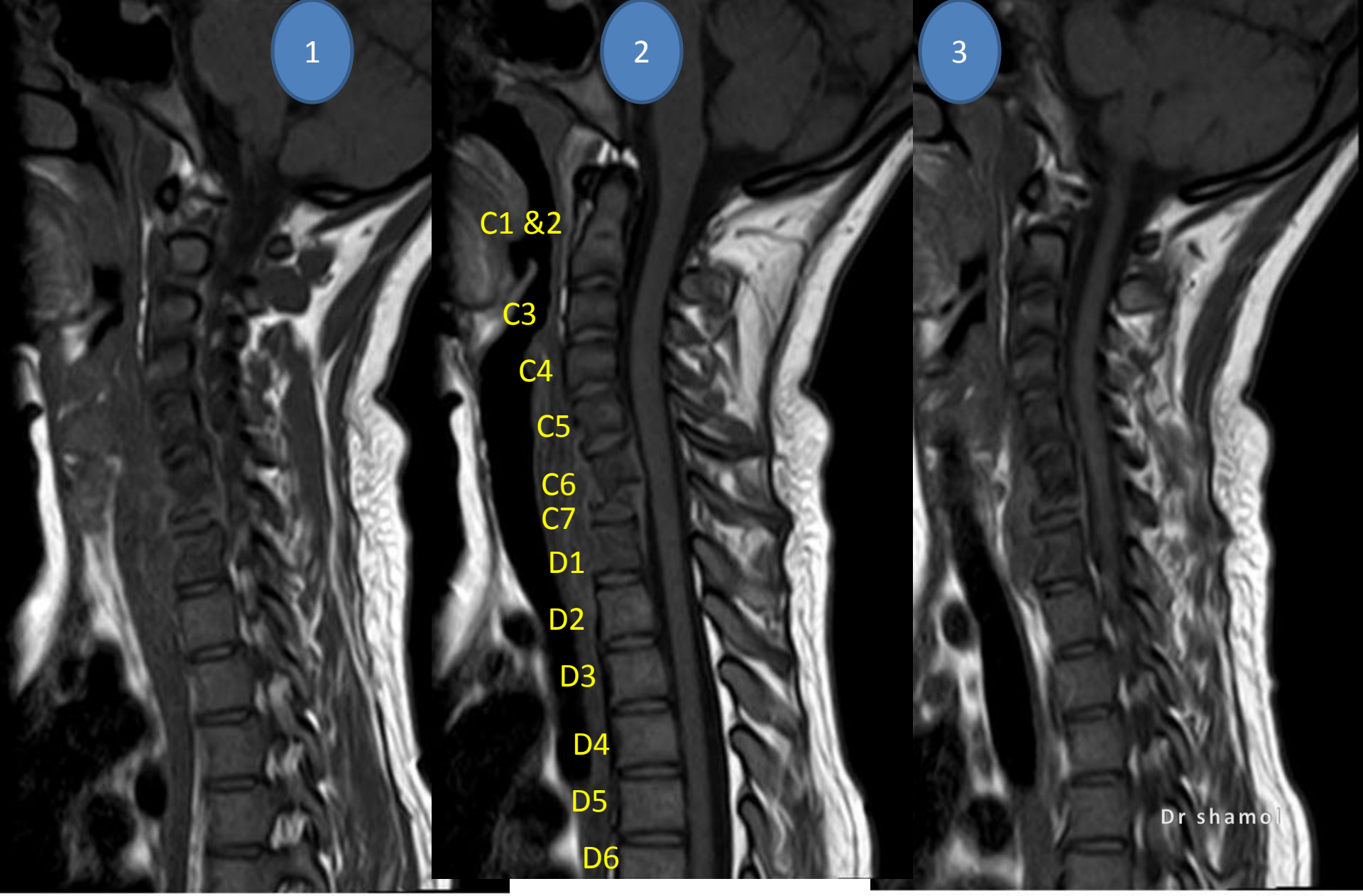
T1

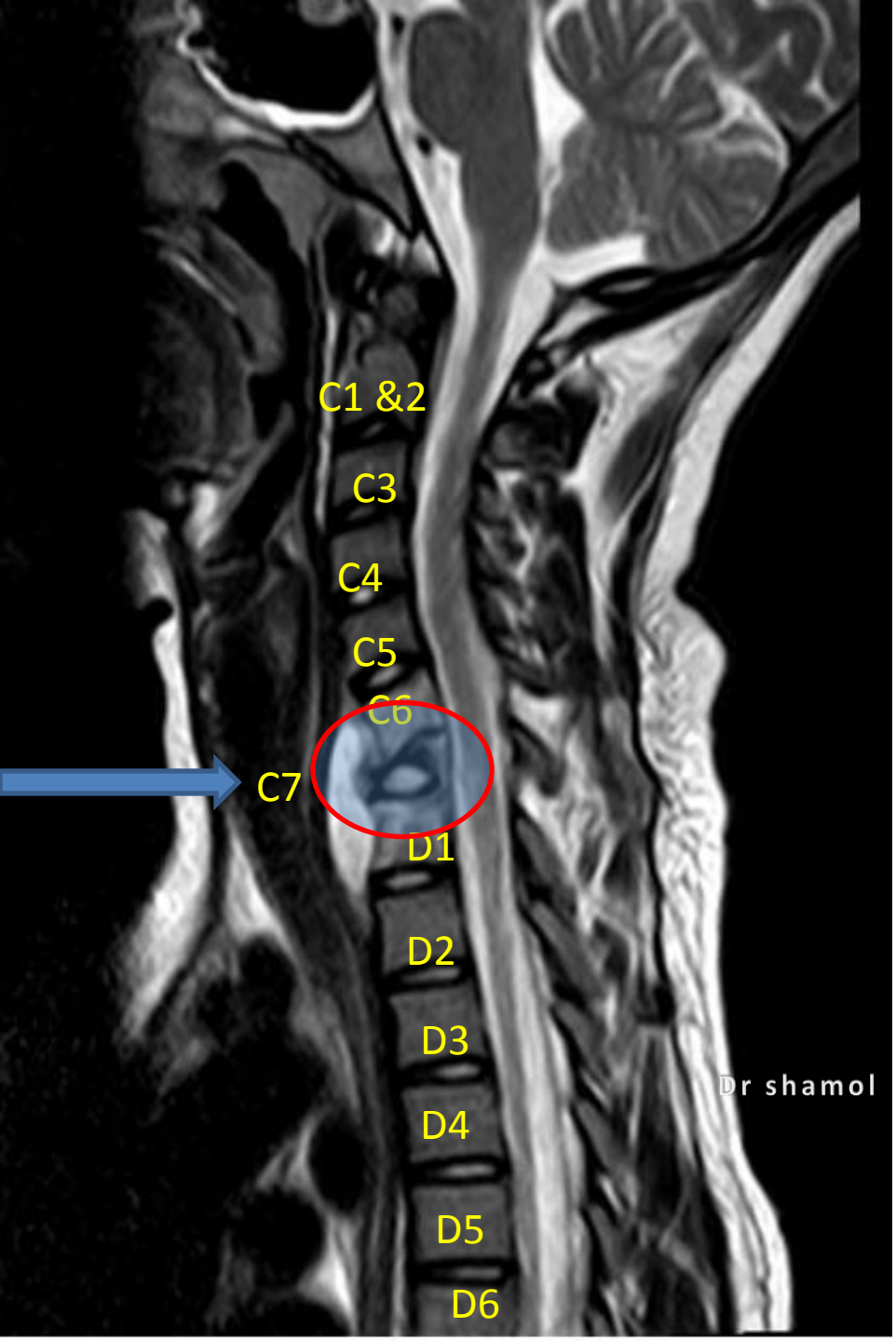
POTTS disease one

Dr shamol



T1

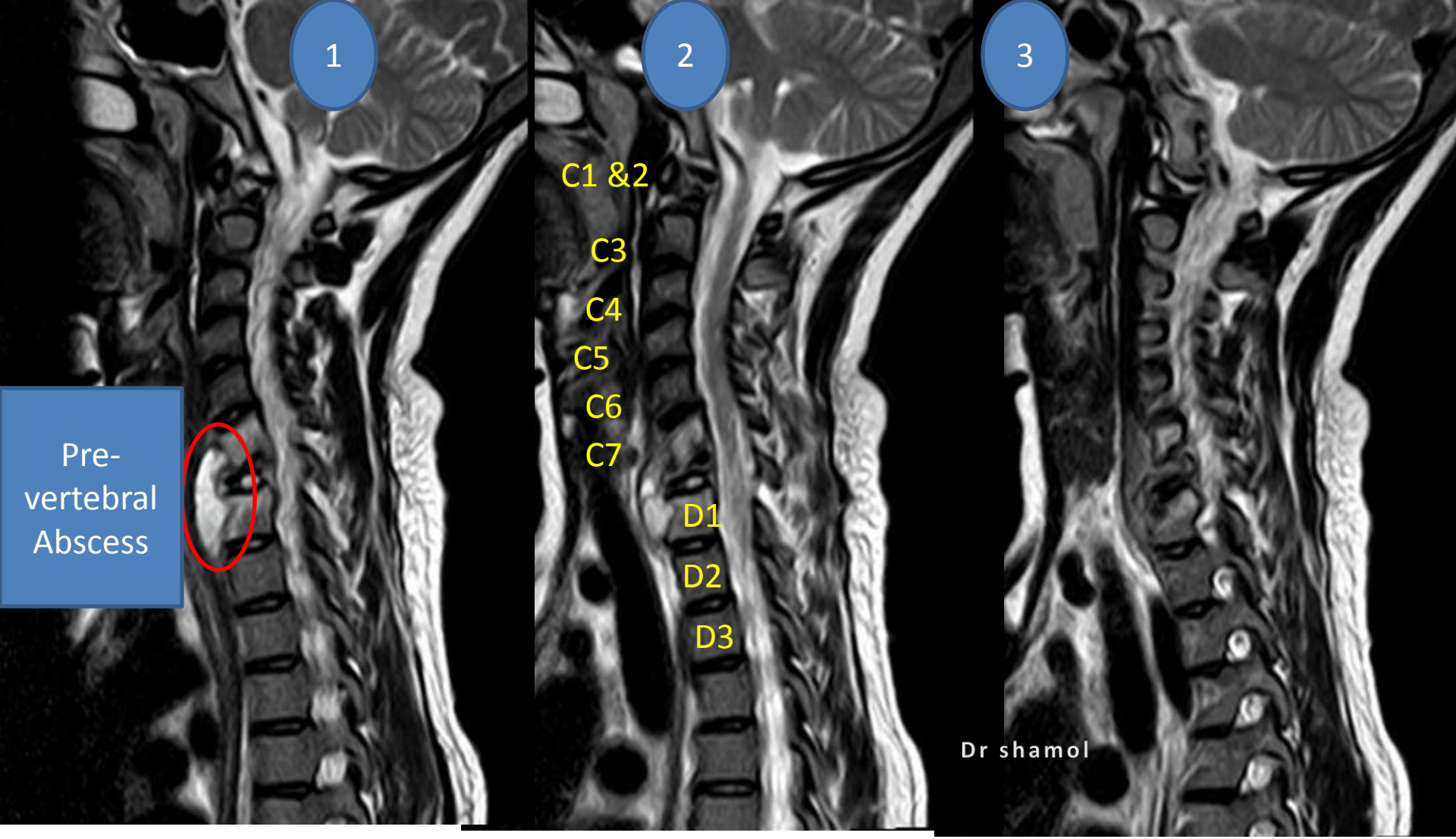

1
2
3
C1 &2
C3
C4
C5
C6
C7
D1
D2
D3
D4
D5
D6
Dr shamol

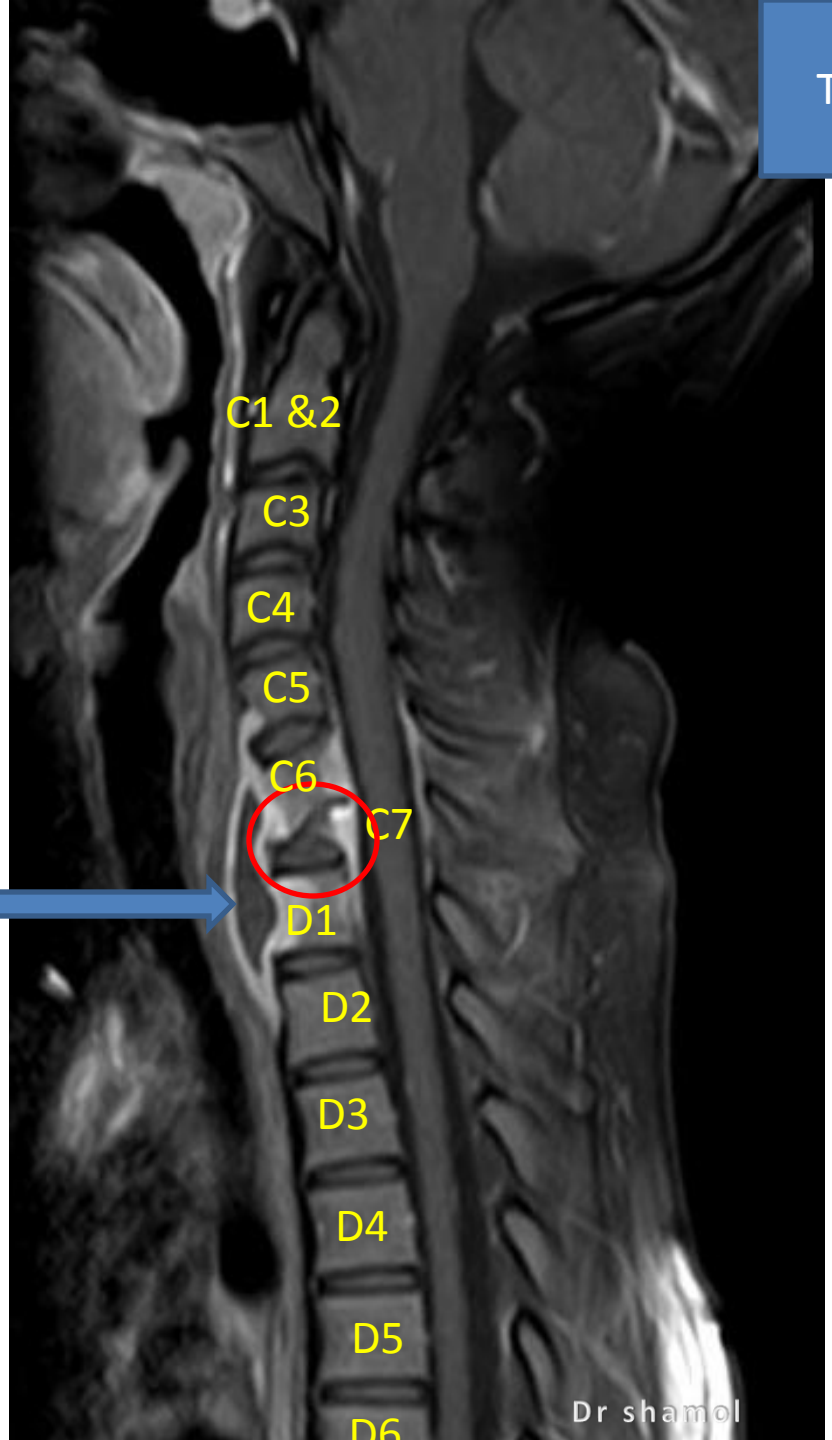


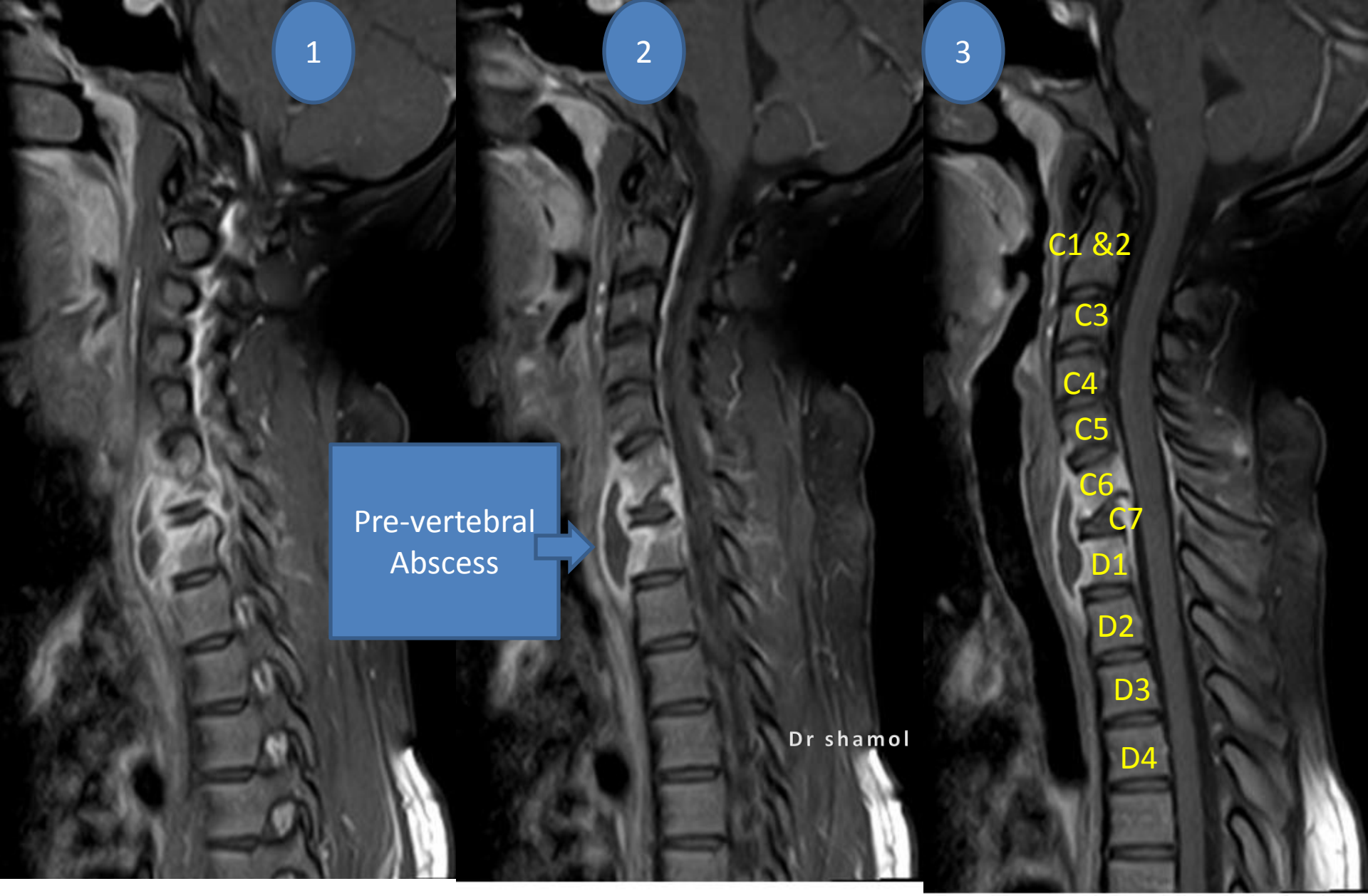
T2

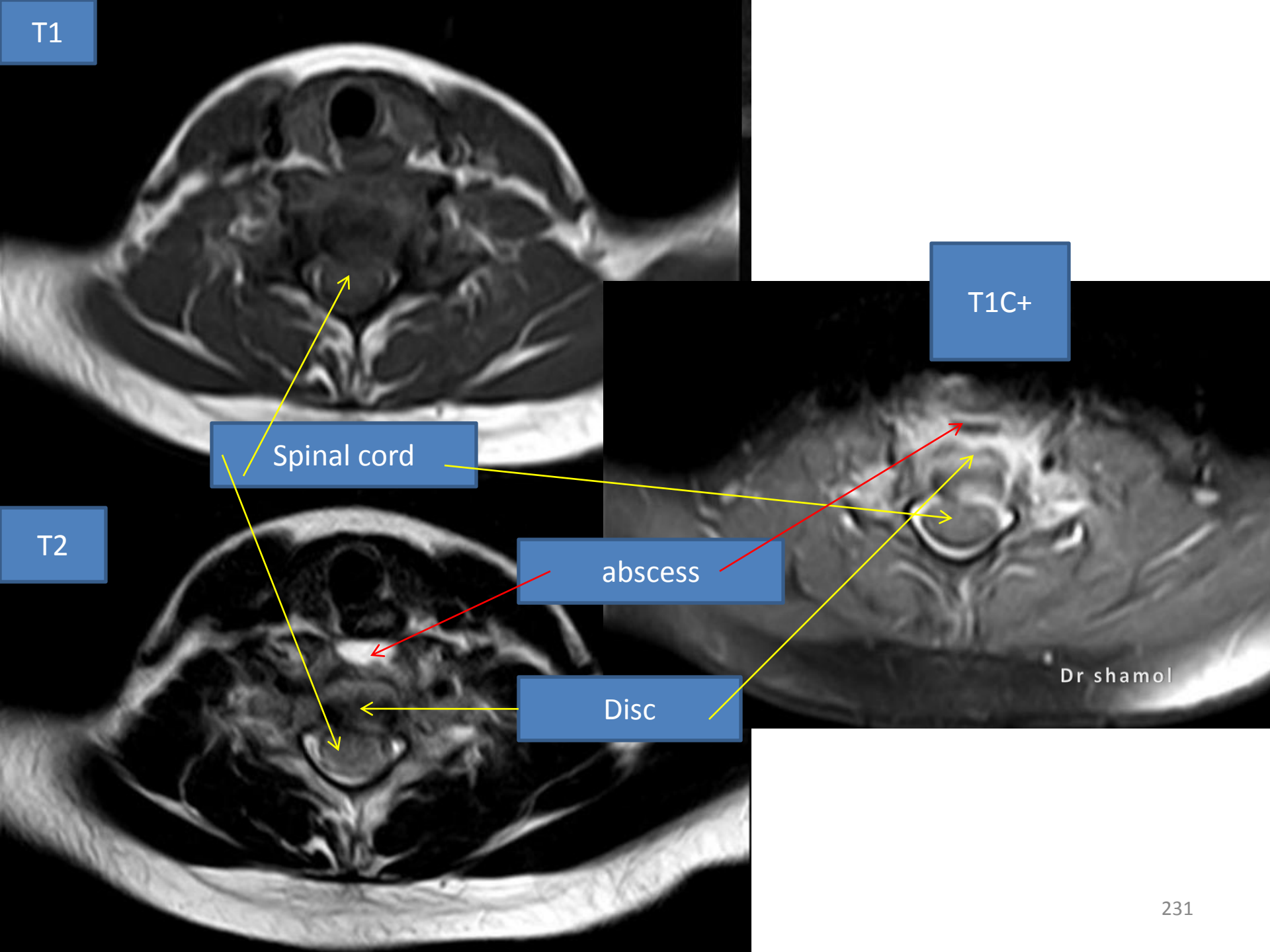
Complete collapse of C7 vertebra with a resultant vertebral plana and localized gibbus deformity. Associated loss of C6-7 disc and prevertebral fluid collection with enhancing margin are noted suggesting a prevertebral abscess. C6 vertebra shows extensive marrow edema.

Dr shamol


1
2
3
Pre-vertebral Abscess
C1 &2
C3
C4
C5
C6
C7
D1
D2
D3
Dr shamol

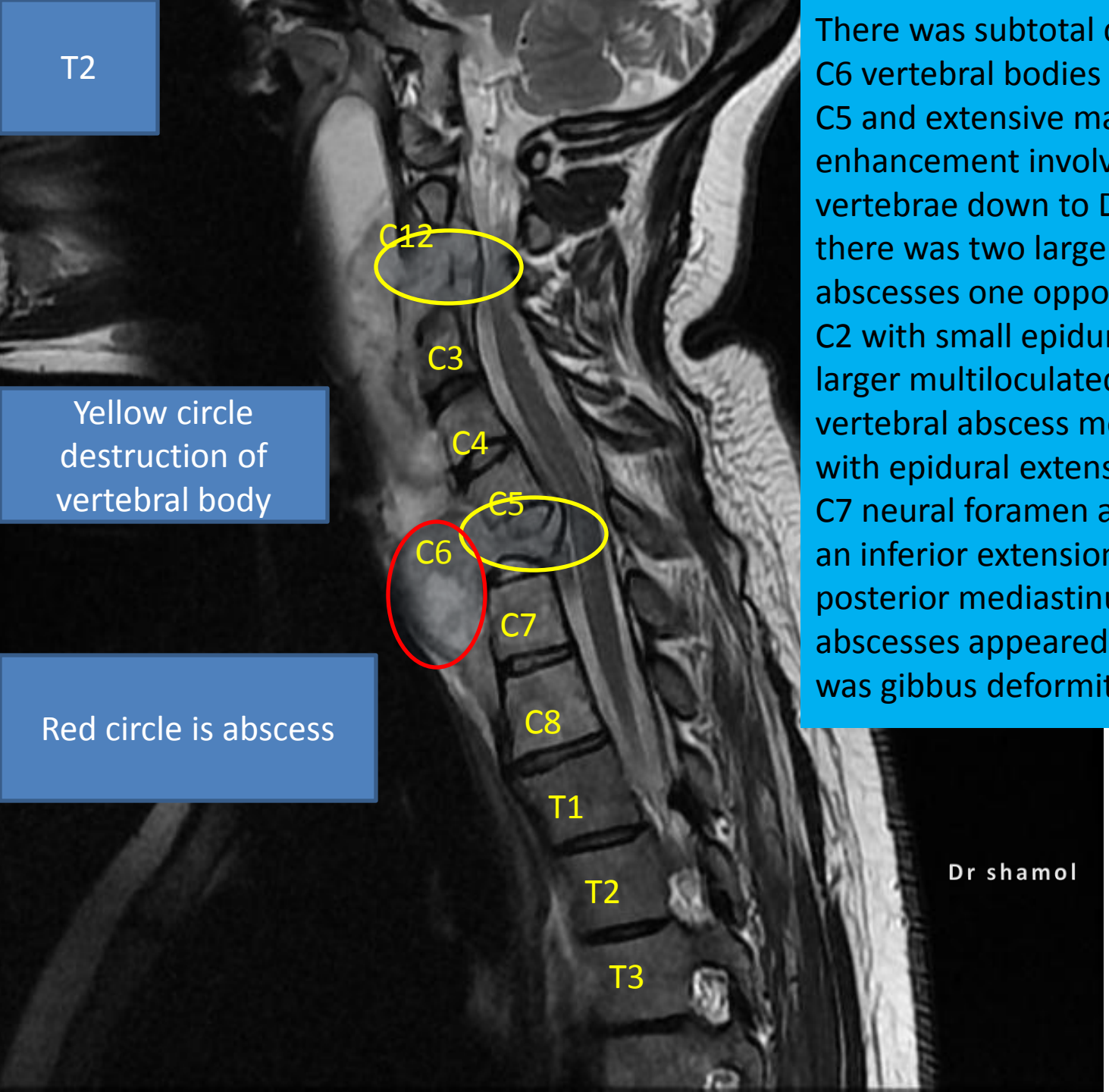

T1C+
C1 &2
C3
C4
C5
C6
C7
D1
D2
D3
D4
D5
D6
Pre-vertebral Abscess
Dr shamol


1
2
3
Pre-vertebral
Abscess
Dr shamol
C1 &2
C3
C4
C5
C6
C7
D1
D2
D3
D4


T1
T1C+
Spinal cord
T2
abscess
Disc
Dr shamol

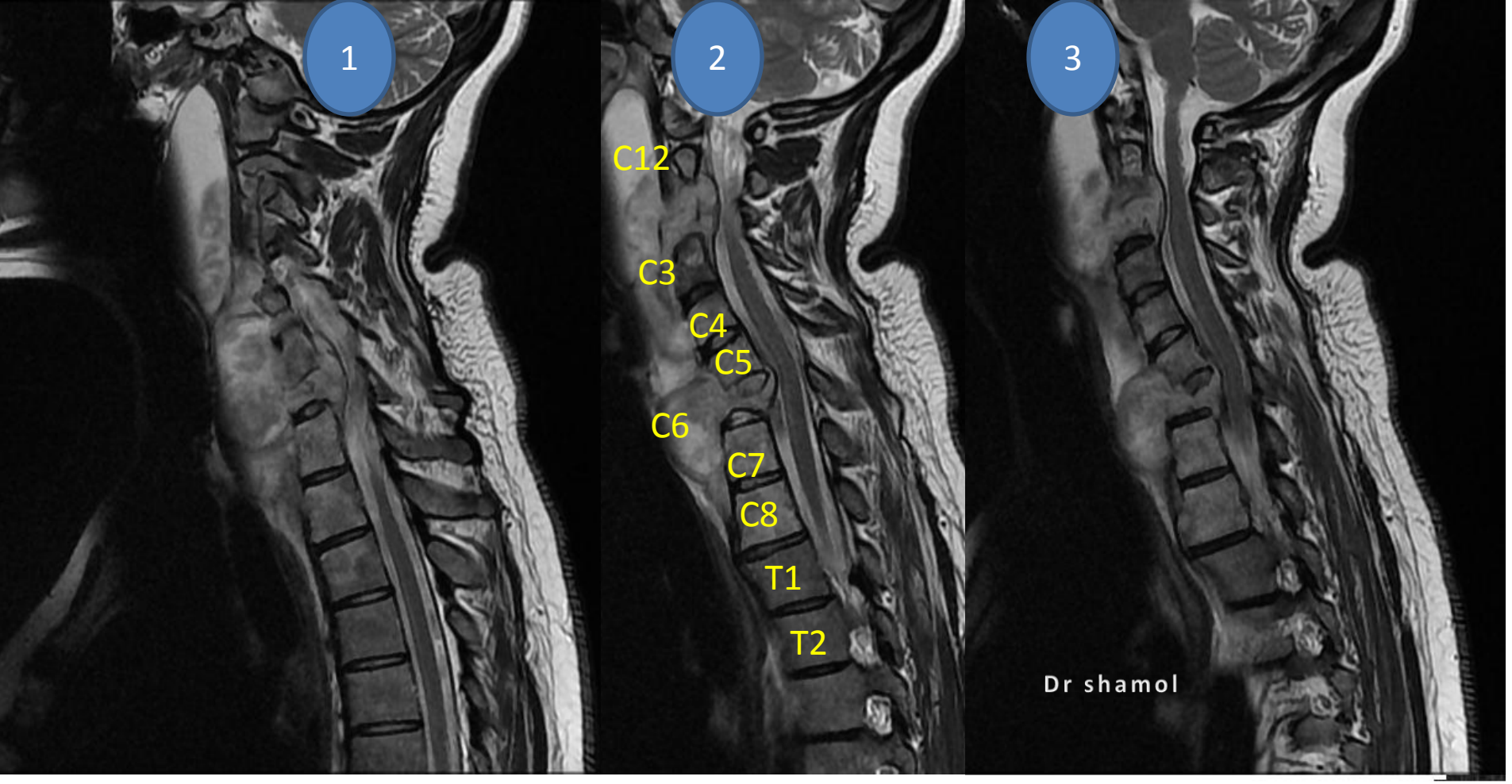
Potts
pott-disease-

Dr shamol

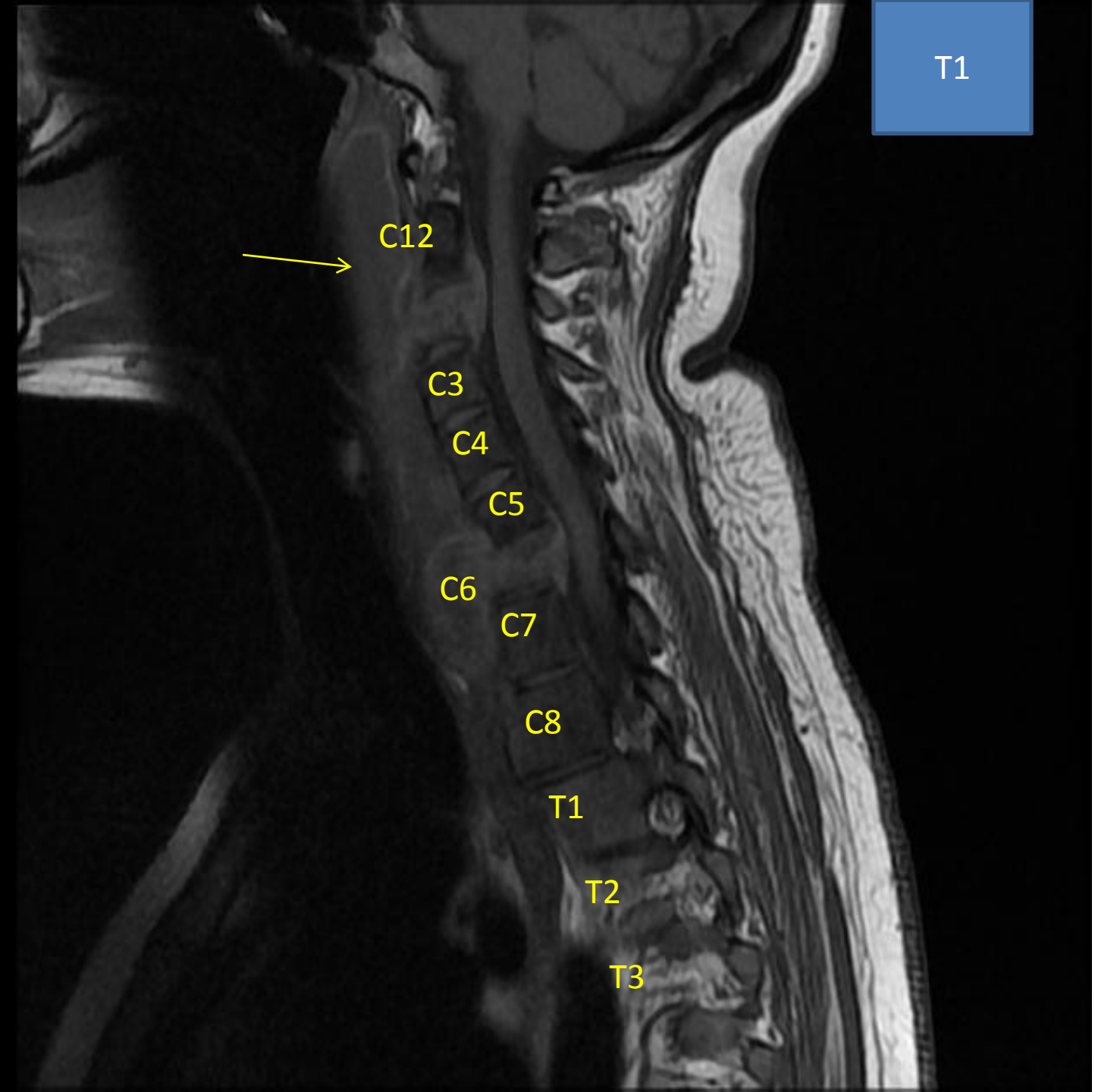


There was subtotal destruction of C2 and C6 vertebral bodies with less affection of C5 and extensive marrow edema and enhancement involving the cervical vertebrae down to D2. Nevertheless, there was two large paravertebral abscesses one opposite the right side of C2 with small epidural component and a larger multiloculated pre and para vertebral abscess more to the right side with epidural extension through right C6-C7 neural foramen and moreover there is an inferior extension reaching the posterior mediastinum. The two abscesses appeared connected. There was gibbus deformity at C6-C7 level.

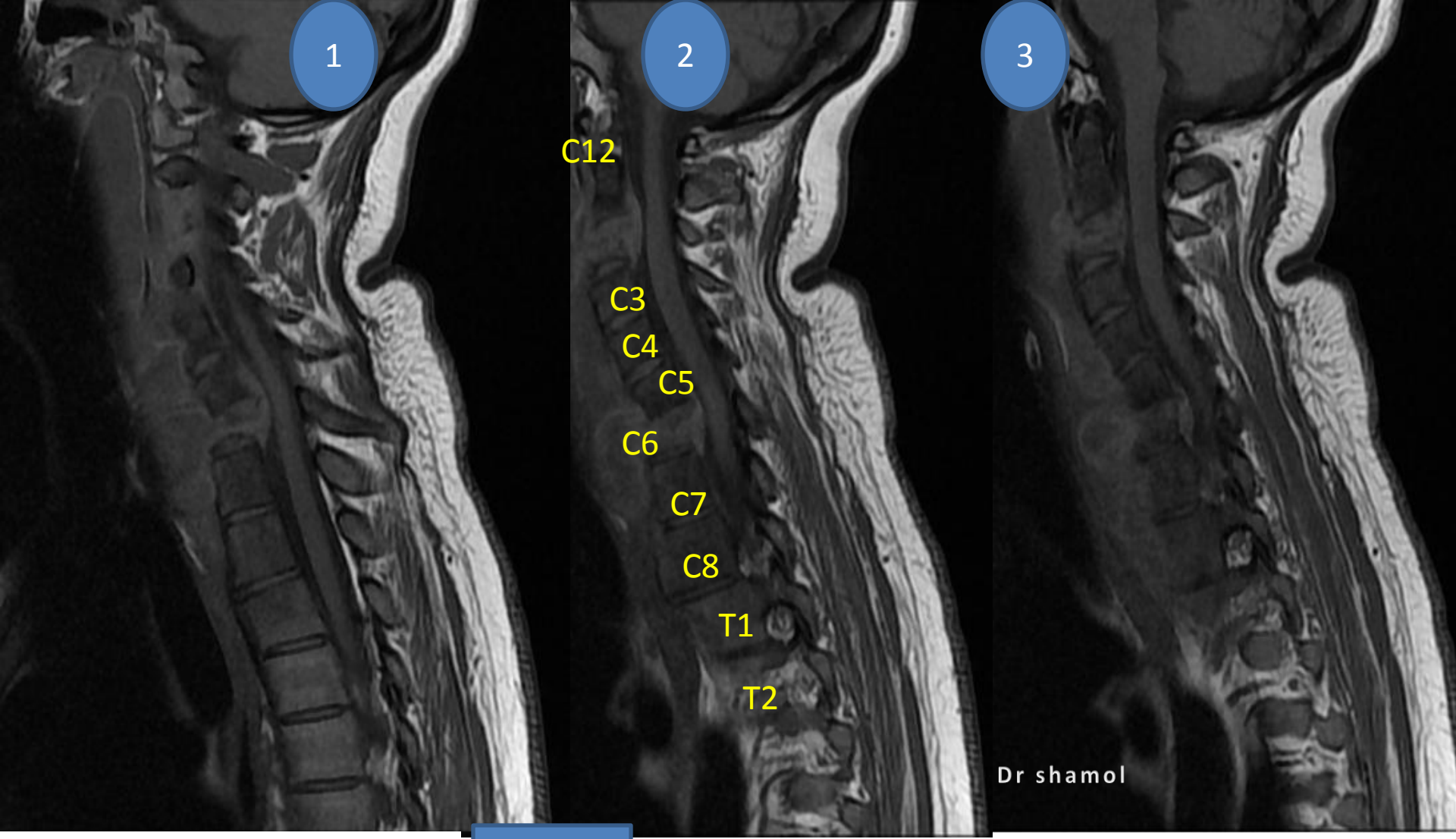
Dr shamol



T2



Dr shamol

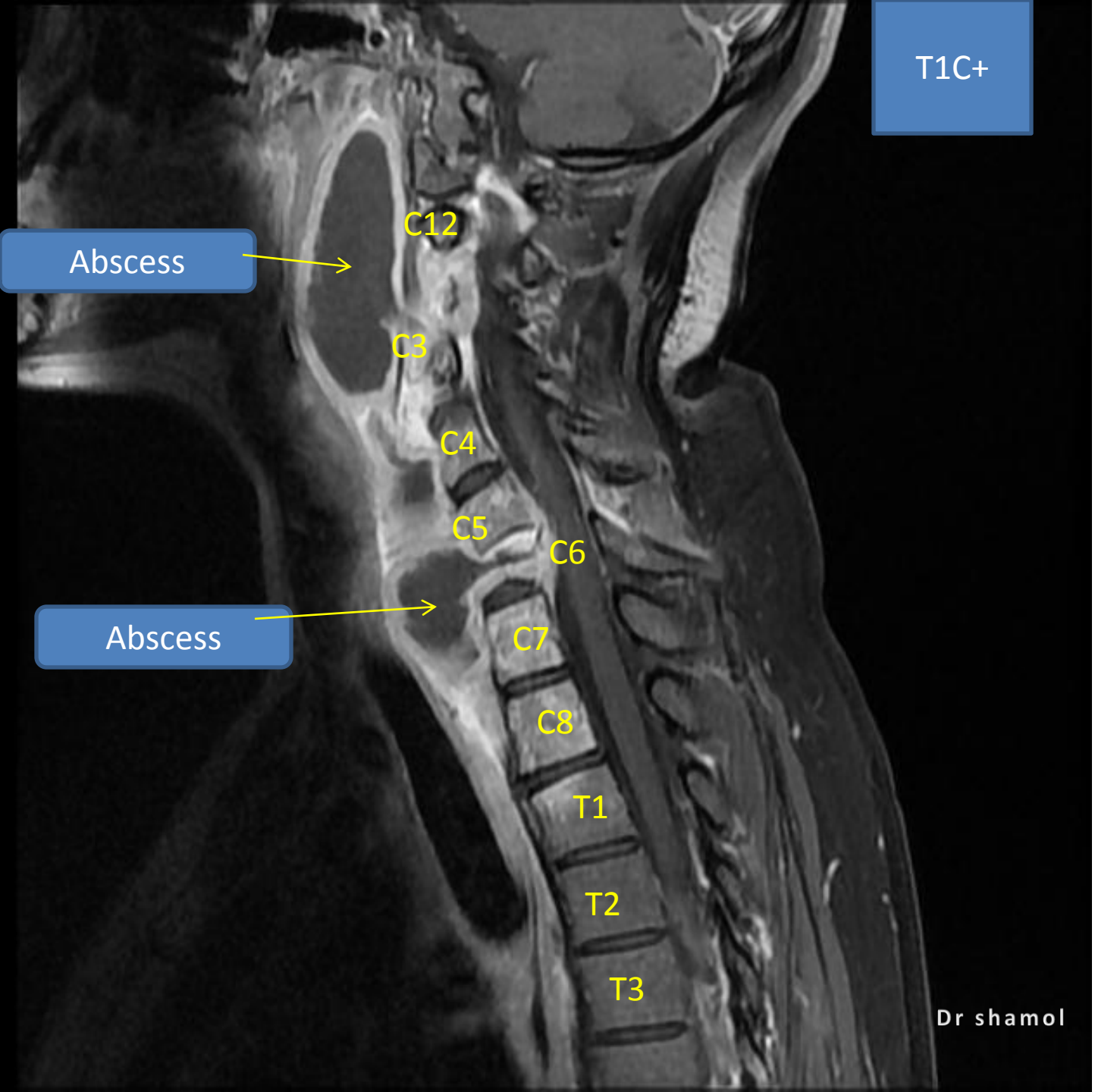


T1

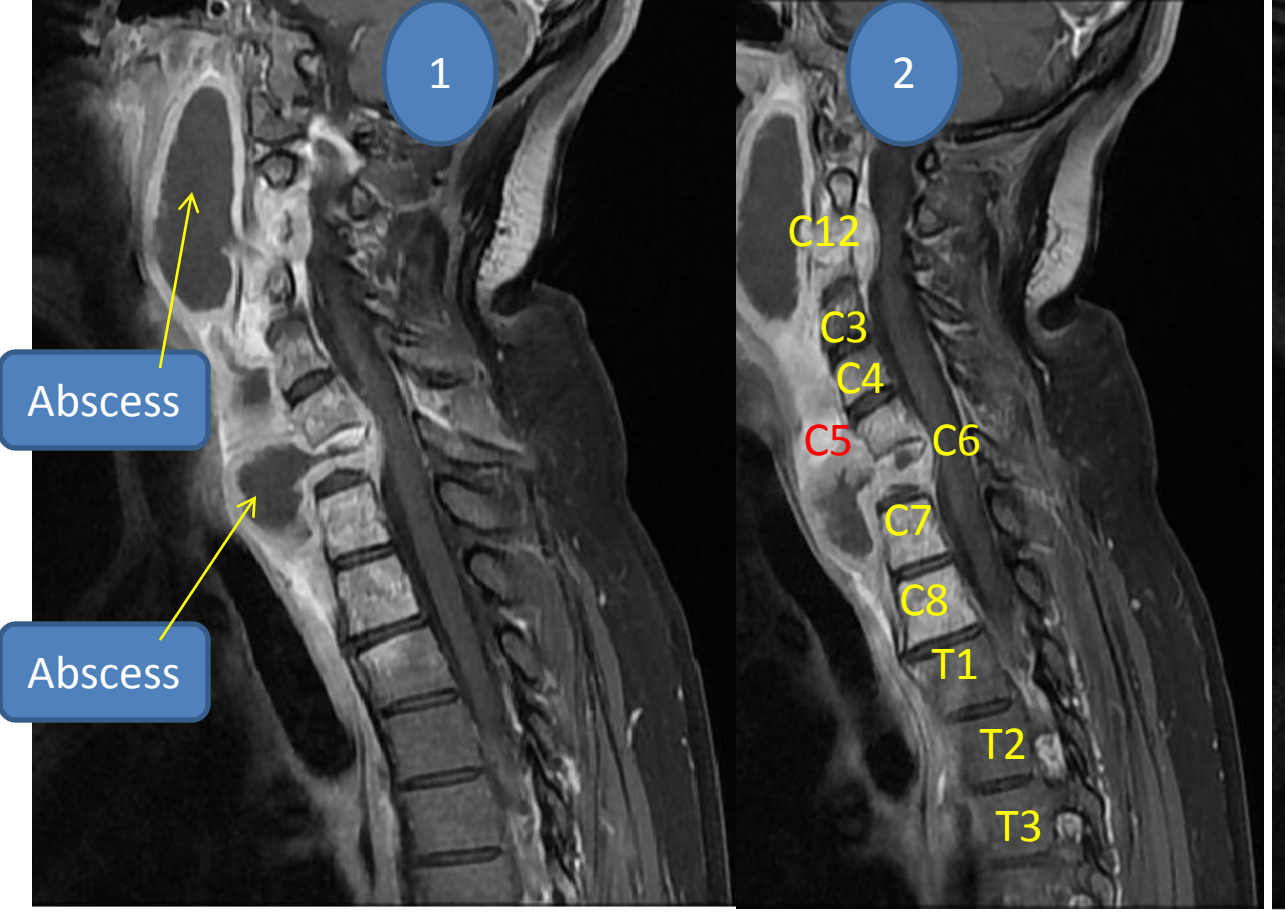
Dr shamol

Potts
pott-disease-

Dr shamol

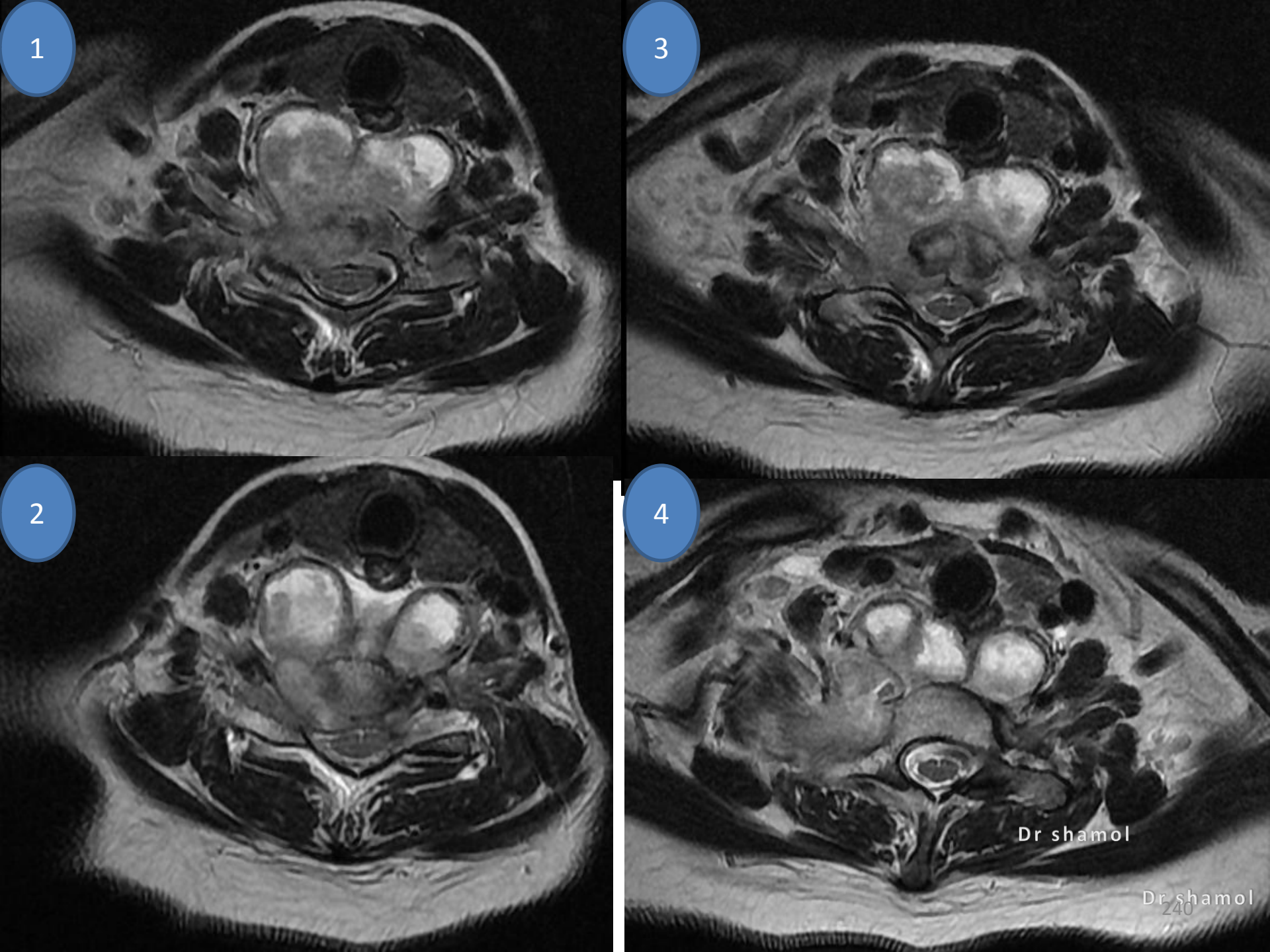


Dr shamol





Dr shamol


1
3
2
4
Dr shamol
Dr shamol

pott-disease-

Dr shamol



T 1

T2

Change in the signal intensity Of disc L1-L2. T1- hypo-intense ,T2- hyper-intense ,Reduce height of disc

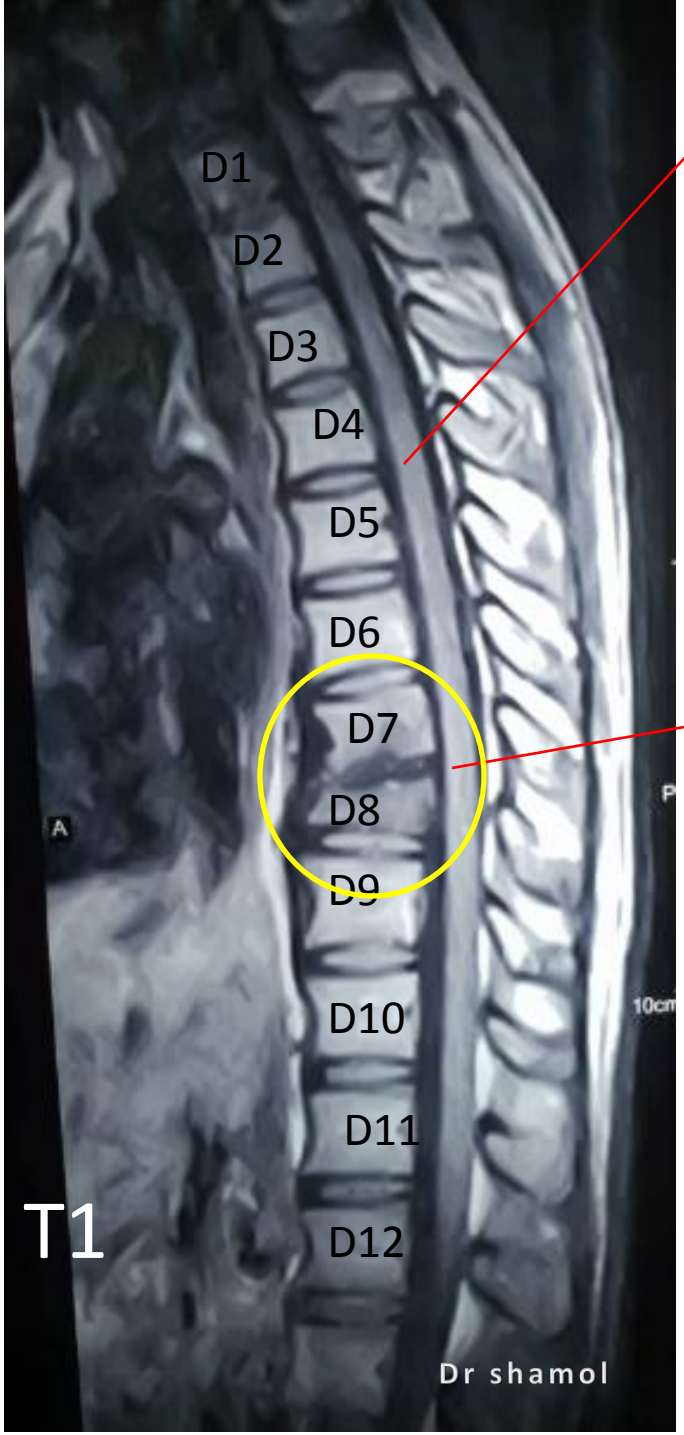




Also change signal in L1 vertebra,
T1- hypo-intense T2- hyper-intense
Reduce height

Small pre -vertebral collection at L1-L2 level
T1- hypo-intense
T2- hyper-intense

Dr shamol



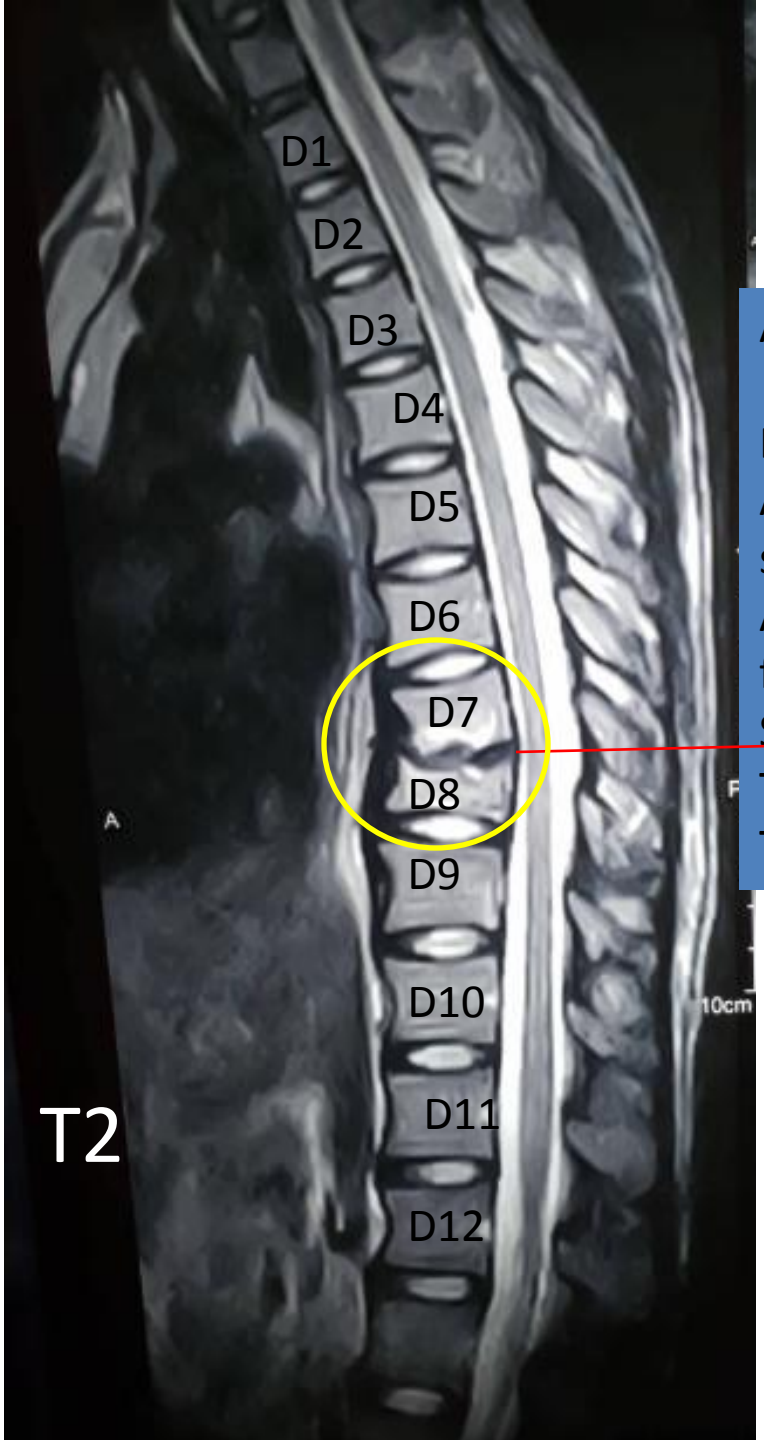
Spinal cord

Abnormal signal intensity (black) notice
in D7-D8 intervertebral disc due to Discitis (loss of height also)
Adjoining D7& D8 vertebral body shows
Abnormal marrow signal intensity -- following
Spondylitis and partial collapse
T1-hypointense
T2-Hyperintense



T1



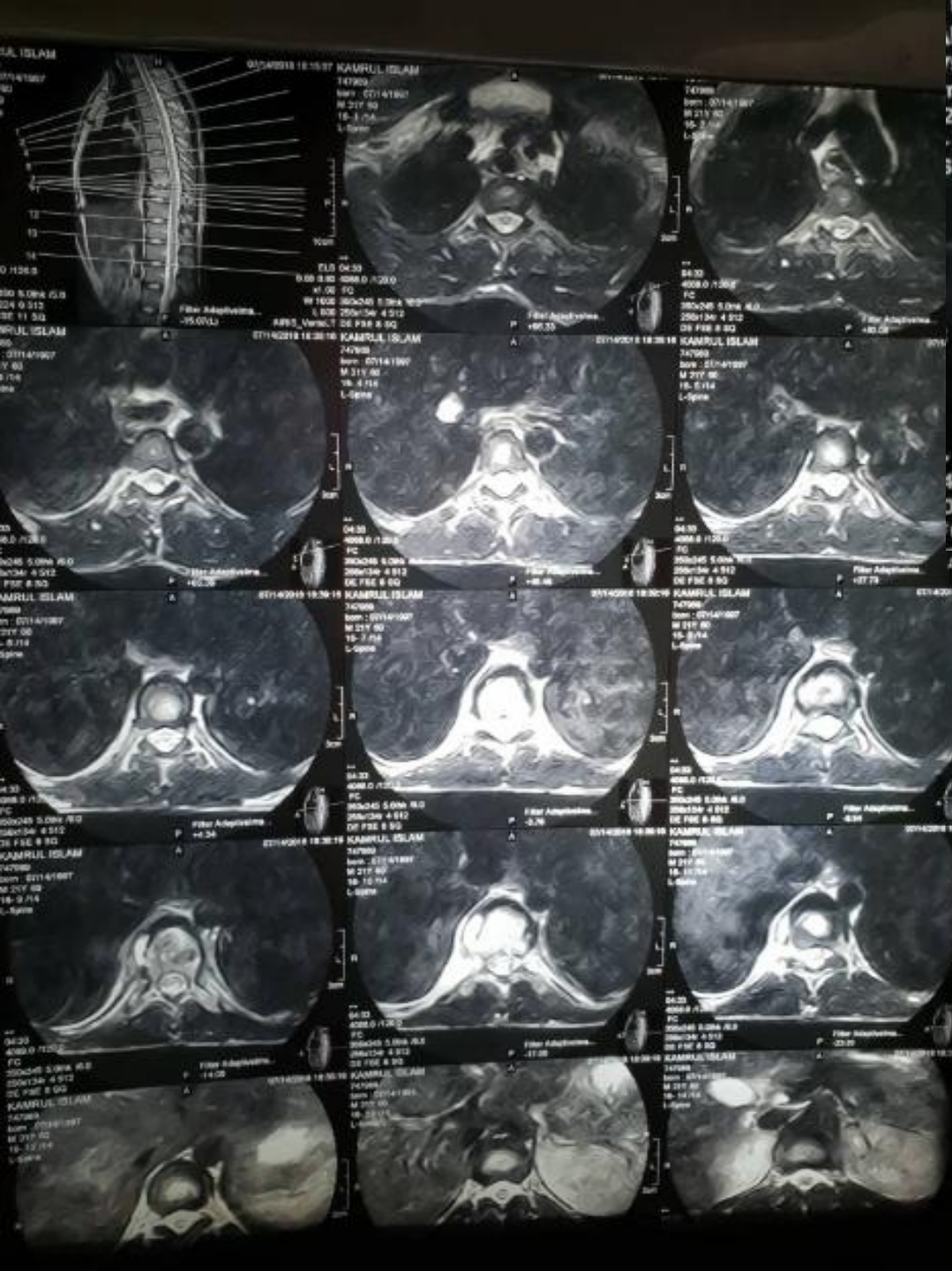


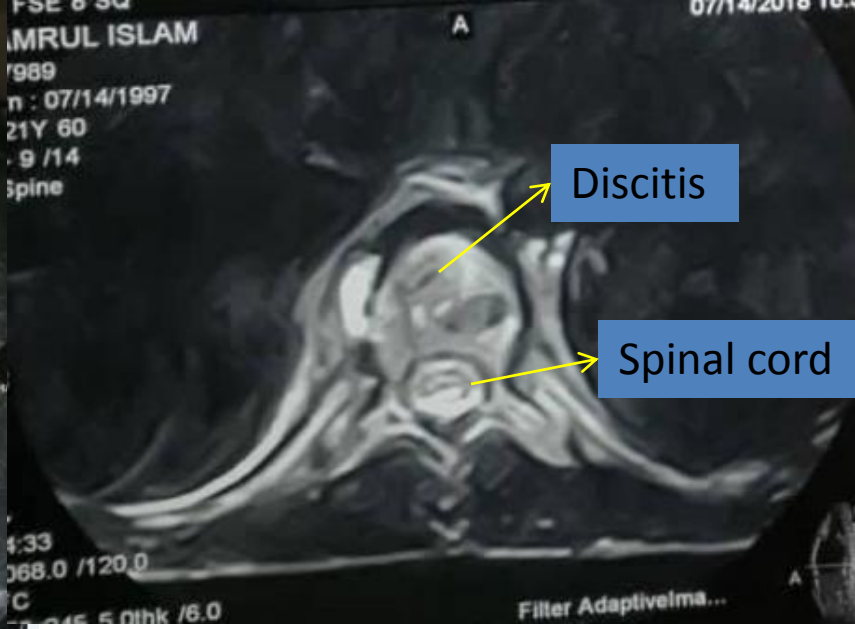
Abnormal signal intensity notice in D7-D8 intervertebral disc due to Discitis (loss of height also)
Adjoining D7& D8 vertebral body shows
Abnormal marrow signal intensity -- following
Spondylitis and partial collapse
T1-hypointense
T2-Hyperintense

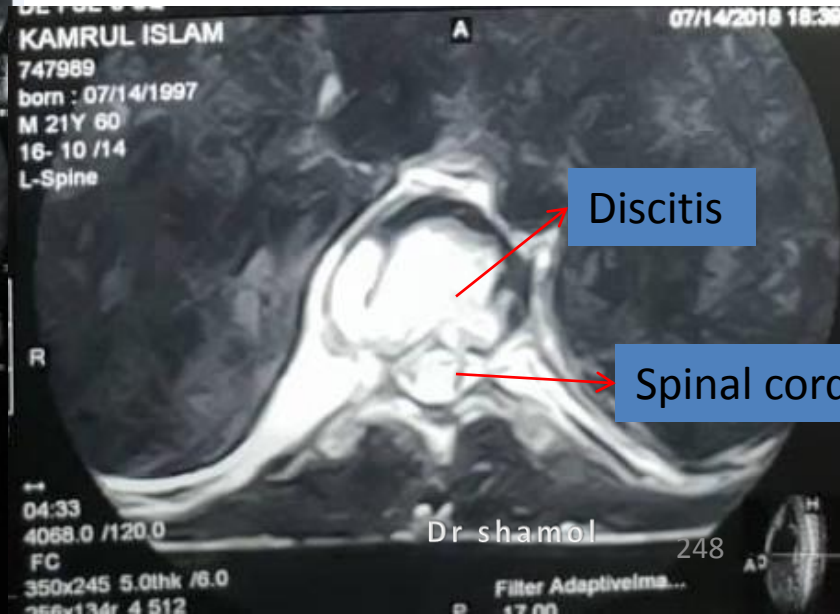


T2






Discitis
Spinal cord


KAMRUL ISLAM
747989
born : 07/14/1997
M 21Y 60
16- 10 /14
L-Spine
Discitis
Spinal cord
04:33
4068.0 /120.0
FC
350x245 5.0thk /6.0
Filter Adaptivelma...

প্রান্ত স্পেশালাইজড হসপিটাল
PRANTO SPECIALIZED HOSPITAL

৬৭ চরপাড়া ঢাকা রোড ময়মনসিংহ। ফোন : +৮৮ ০৯১ ৬৬৫৪৪ E-mail : prantospecilisedhospital@gmail.com

Film. No.	:	747989						
Pt's Name	:	Kamrul Islam	Date	:	14-07-2018			
Refd. By	:	**Dr. Mohammad Shohidullah Shamol;** MBBS, BCS(Health), FCPS (Medicine), MMCH.	Age	:	21	Yrs.	Sex :	M

Clinical information: -

MRI SCAN OF DORSAL SPINE

Thank you for referring this case. Following are the findings: -

Multiplanar MR imaging of the dorsal spine was performed using a phased-array spine coil and large FOV.

Normal dorsal kyphosis is lost.
Abnormal signal intensity is noted in D7-8 intervertebral disc to suggest discitis.
Adjoining D7 and D8 vertebral body shows abnormal marrow signal intensity- following spondylitis and partial collapse (T1 hypointense, T2 hyperintense).
Posterior elements are free from lesion.
The intervertebral discs appear normal.

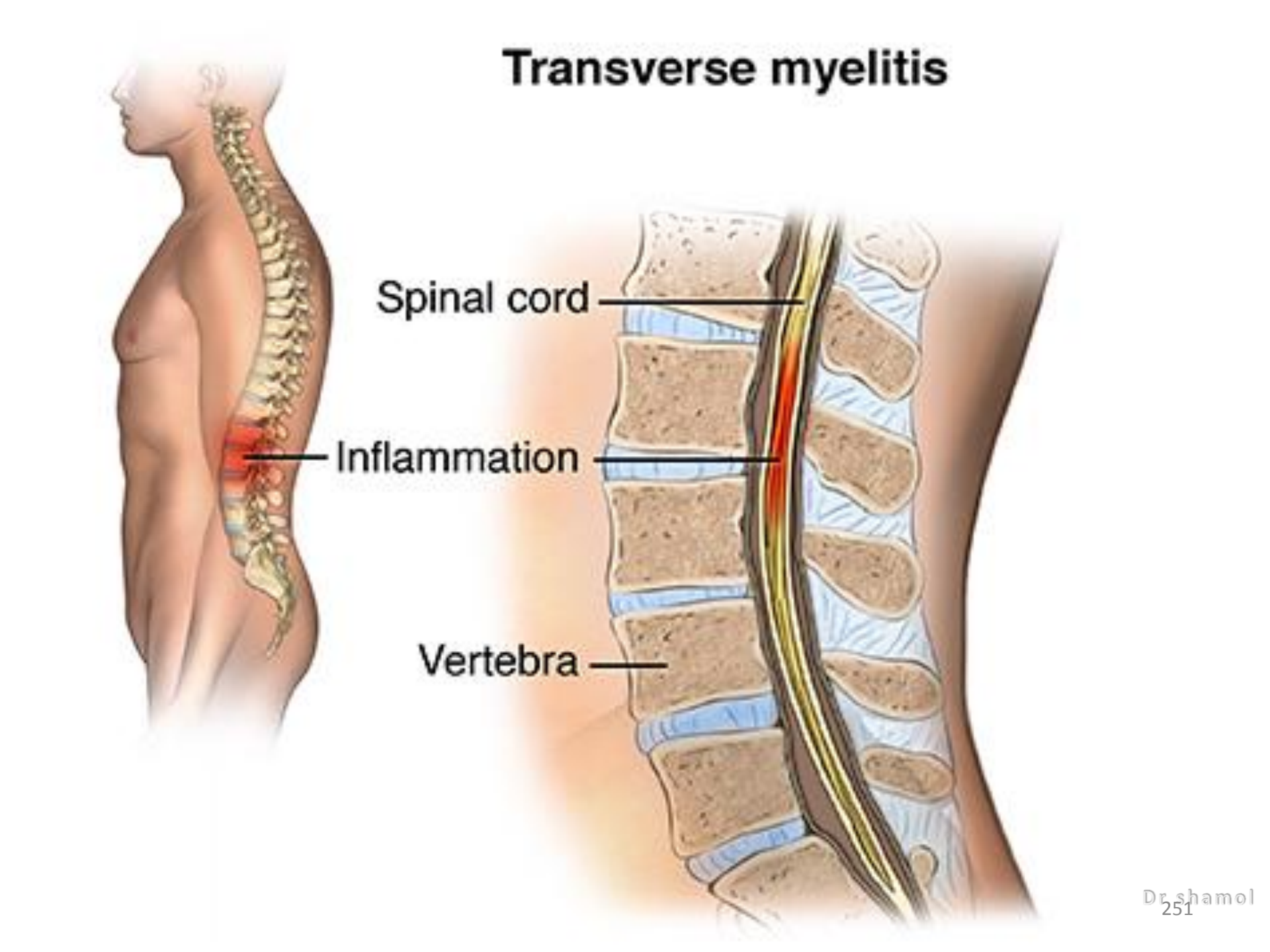
D1-2 to D12-L1 discs reveal no significant posterior bulge or herniation.

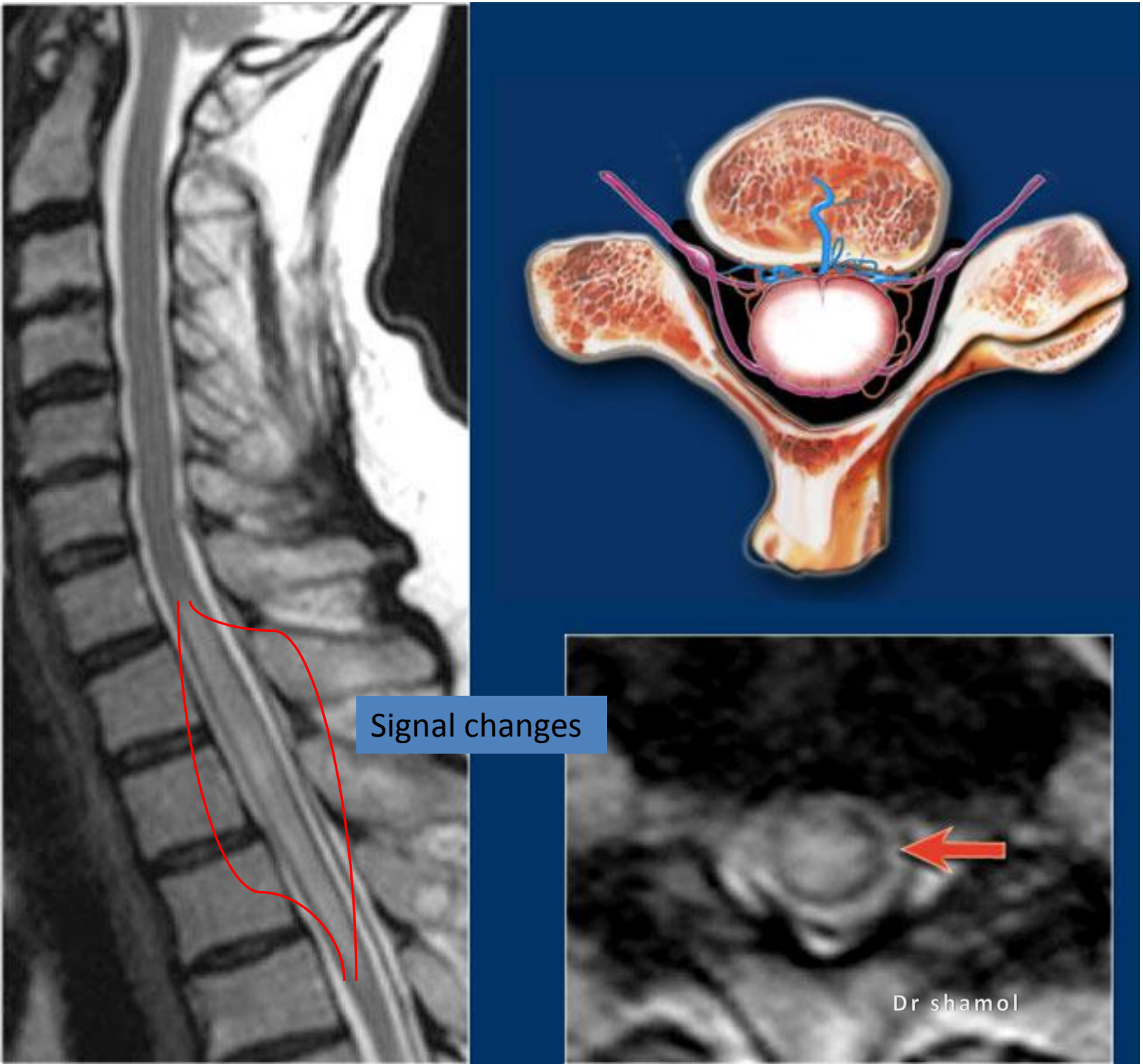
Spinal cord is normal in thickness and reveals normal signal intensity. No focal area of abnormal signal is detected within the cord. No intraspinal mass lesion is detected. No abnormality is detected in the pre-vertebral region. The vascular structures are normal. Spinal canal measurements are within normal limit.

IMPRESSION:
MR scan reveal:
The above findings are suggestive of Pott's spine involving D7 & D8.

Non-compressive myelopathy

Dr shamol


Transverse myelitis
Spinal cord
Inflammation
Vertebra

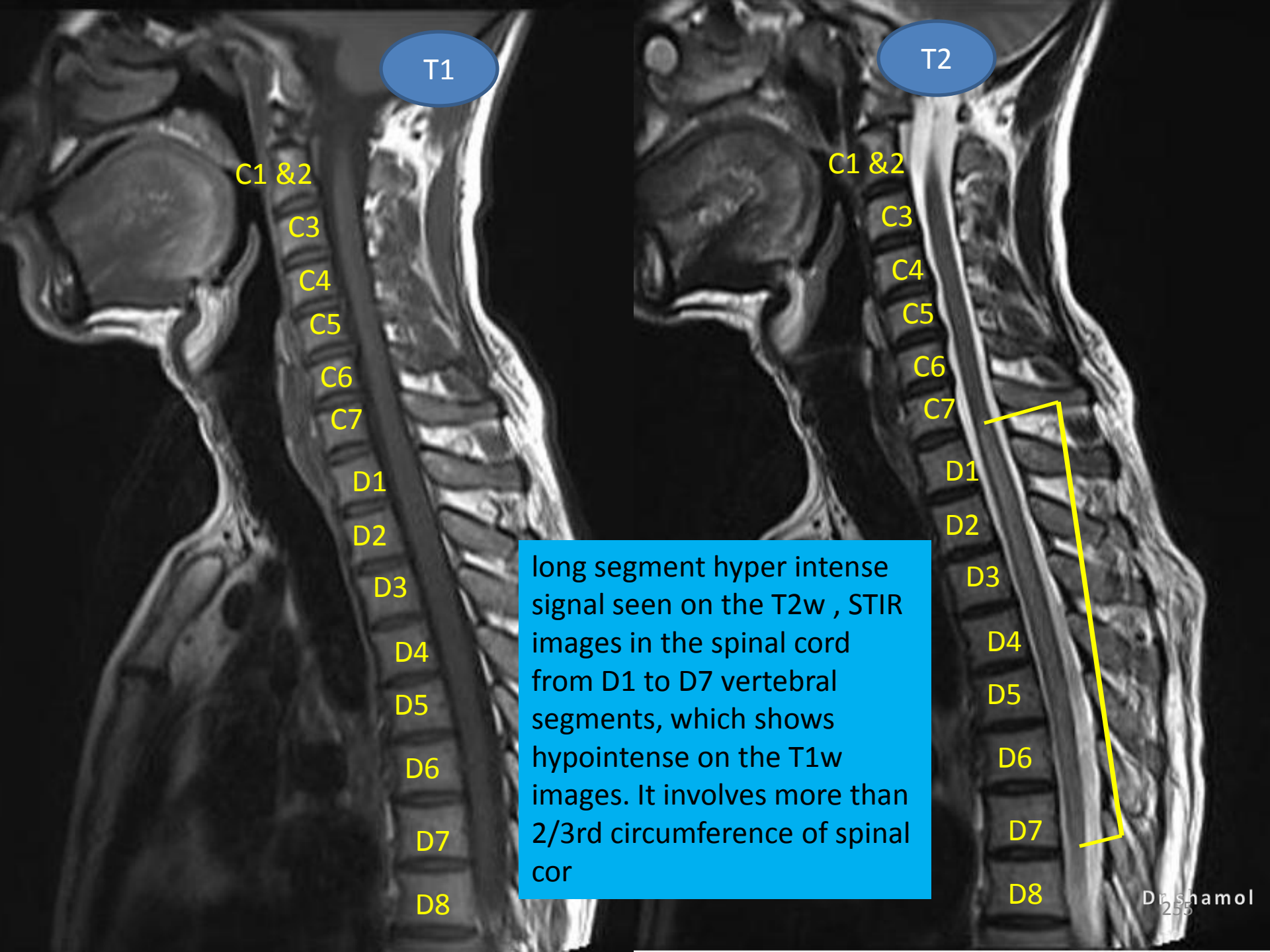

Signal changes
Dr shamol

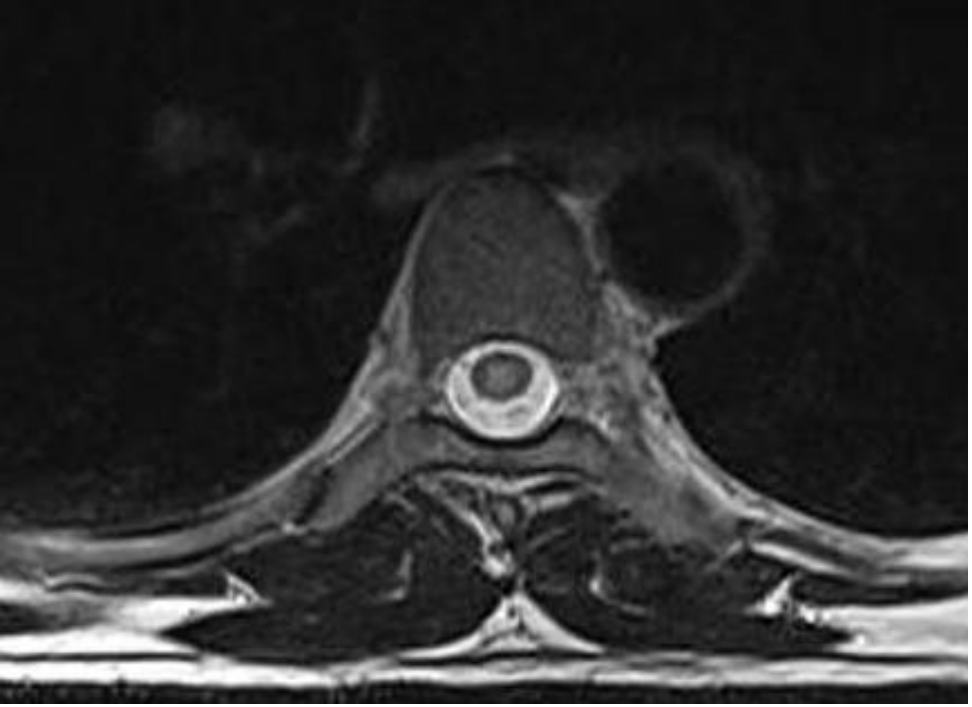
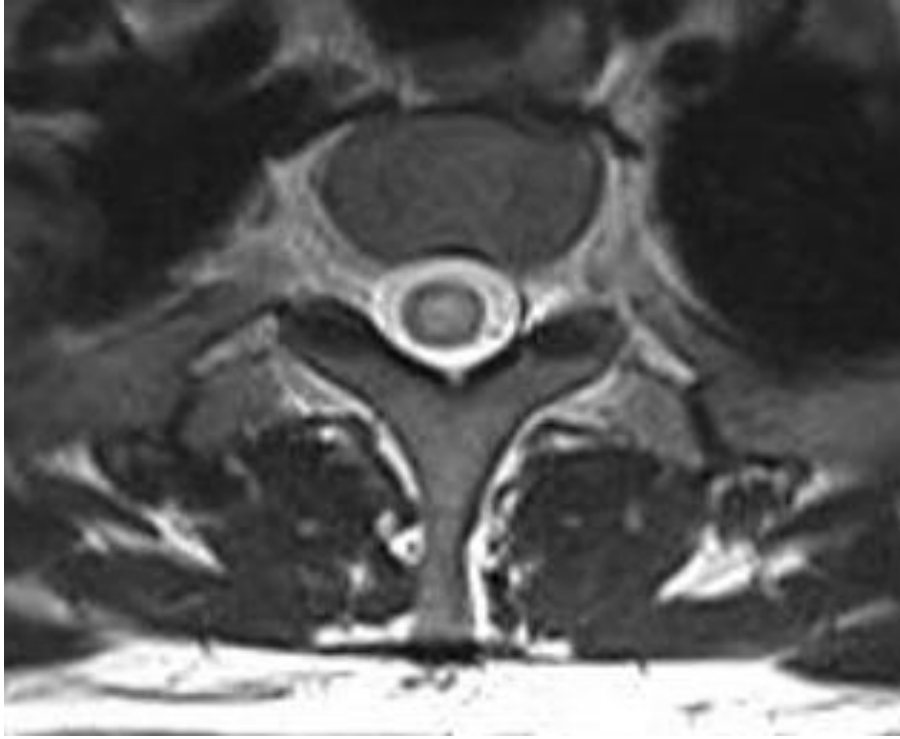
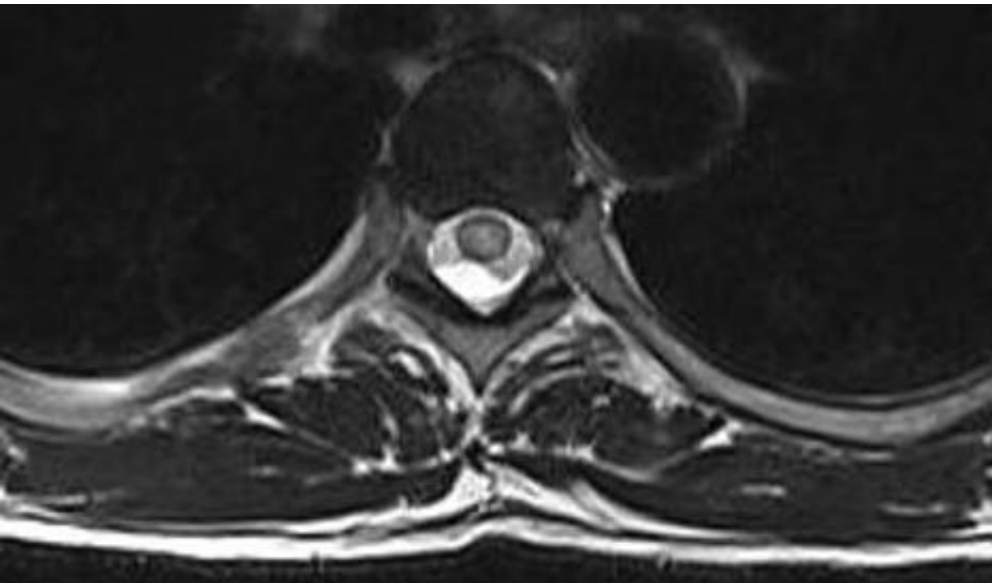
Typical signal characteristics include:
T1: isointense or hypointense
T2: poorly delineated hyperintense signal
T1 C+ (Gd): variable enhancement patterns (none, diffuse, patchy, peripheral)

Dr shamol

Acute transvers myelitis case #1

Dr shamol

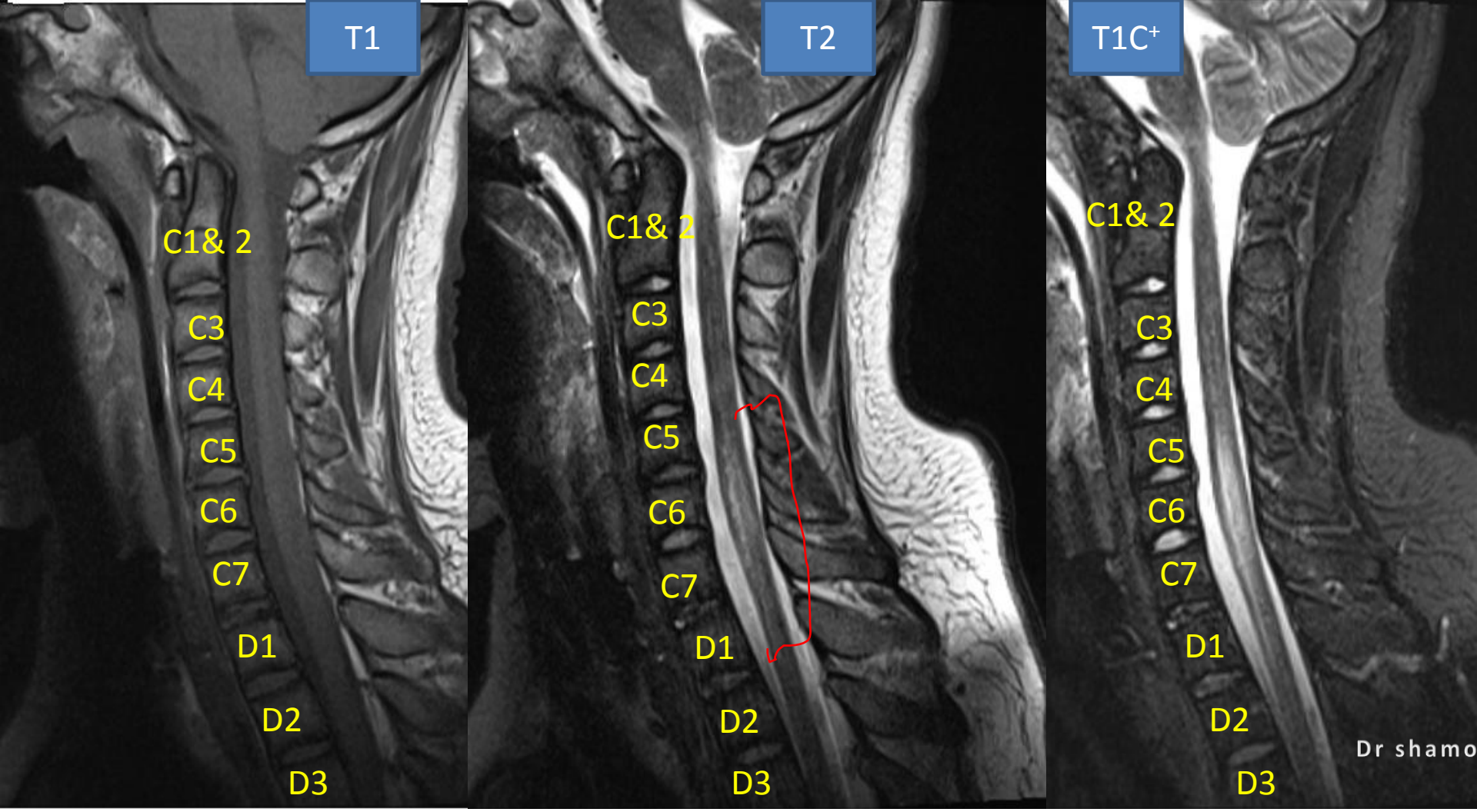

T1
C1 &2
C3
C4
C5
C6
C7
D1
D2
D3
D4
D5
D6
D7
D8
T2
C1 &2
C3
C4
C5
C6
C7
D1
D2
D3
D4
D5
D6
D7
D8
long segment hyper intense signal seen on the T2w , STIR images in the spinal cord from D1 to D7 vertebral segments, which shows hypointense on the T1w images. It involves more than 2/3rd circumference of spinal cor
Dr shamol

Dr shamol

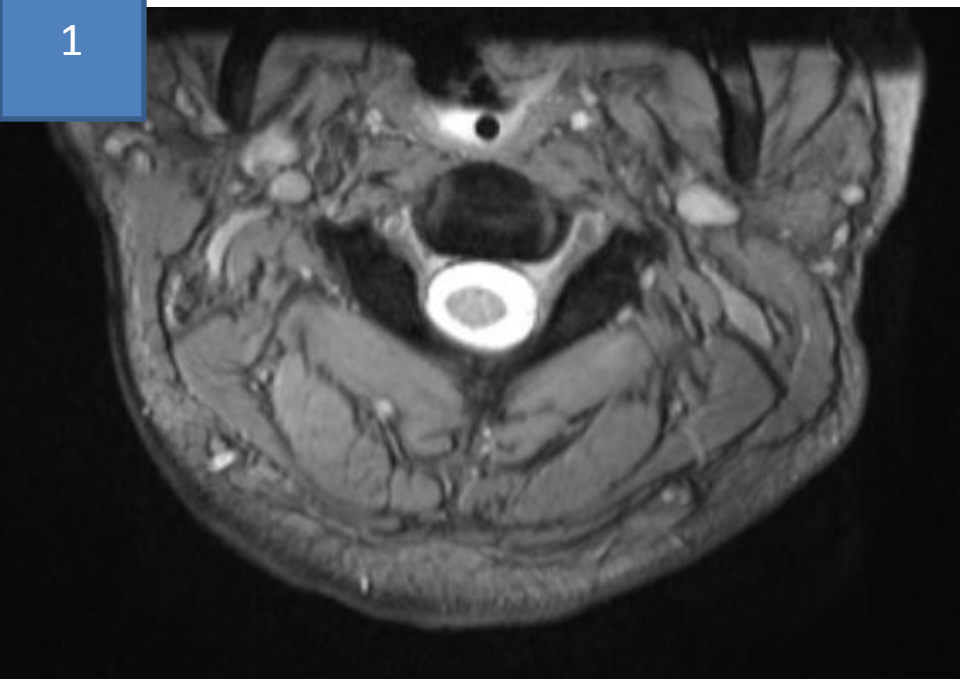
Acute transvers myelitis case #2

Dr shamol

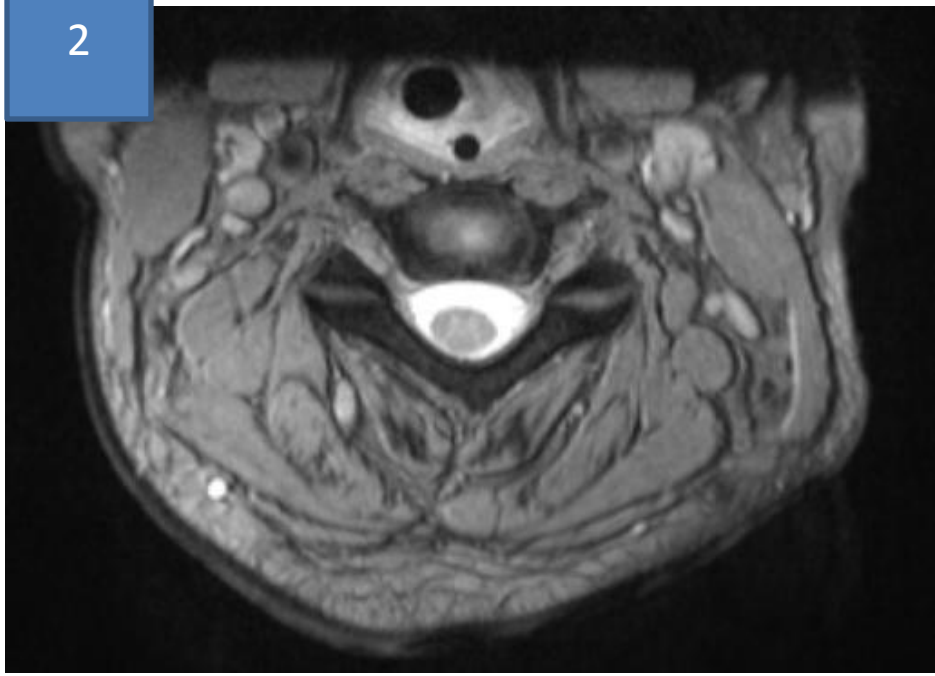


segment between C5-T1 level with symmetrical high signal change involving both sides of the cord. Associated faint ill defined enhancement of this segment of cord.

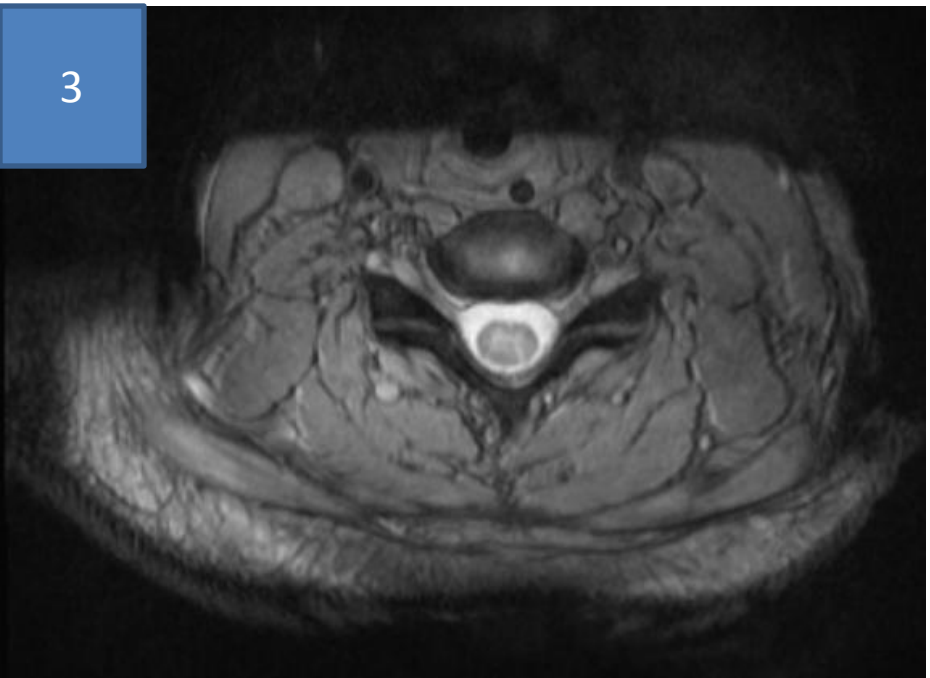
1



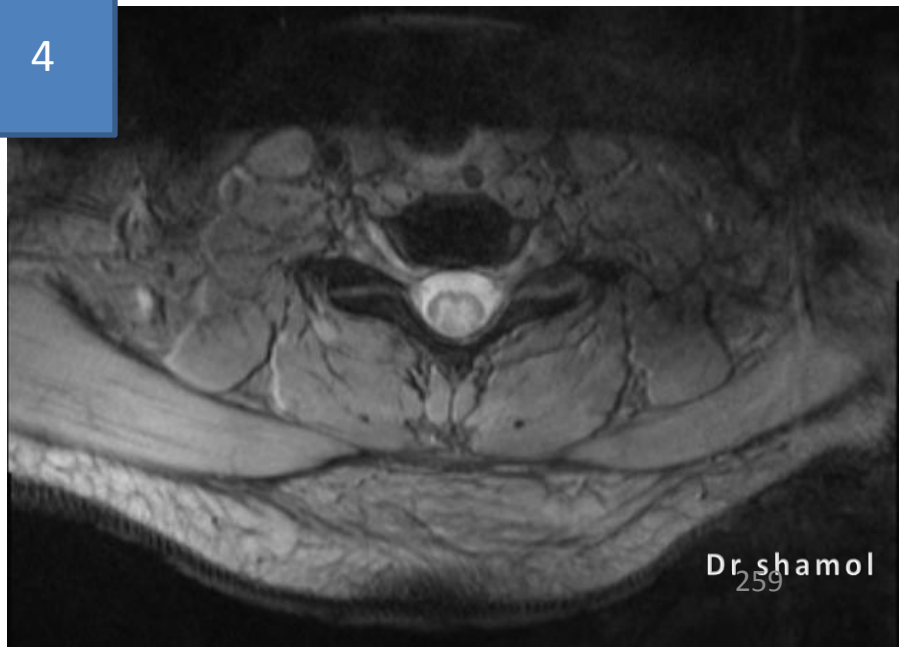
2



3

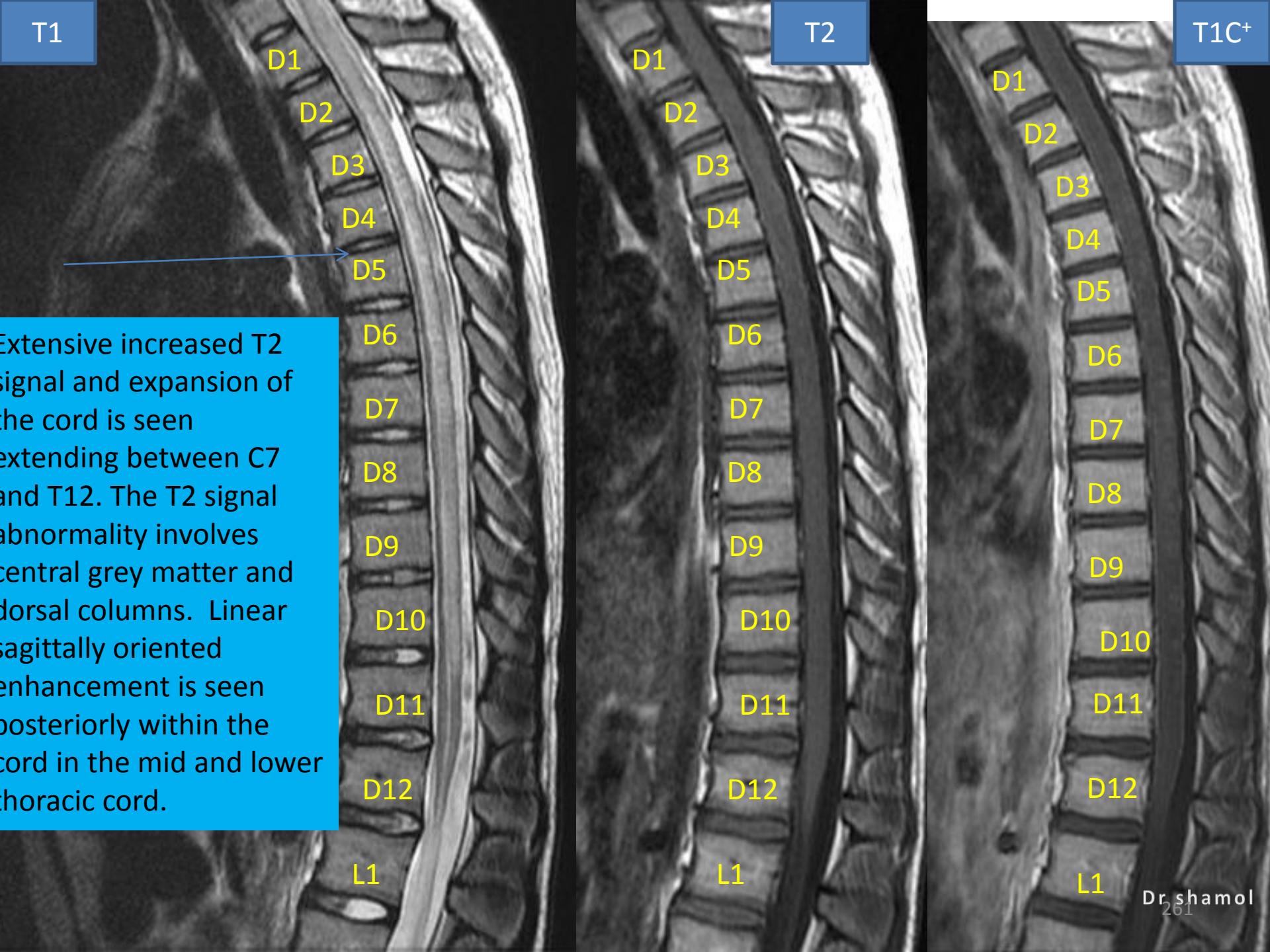


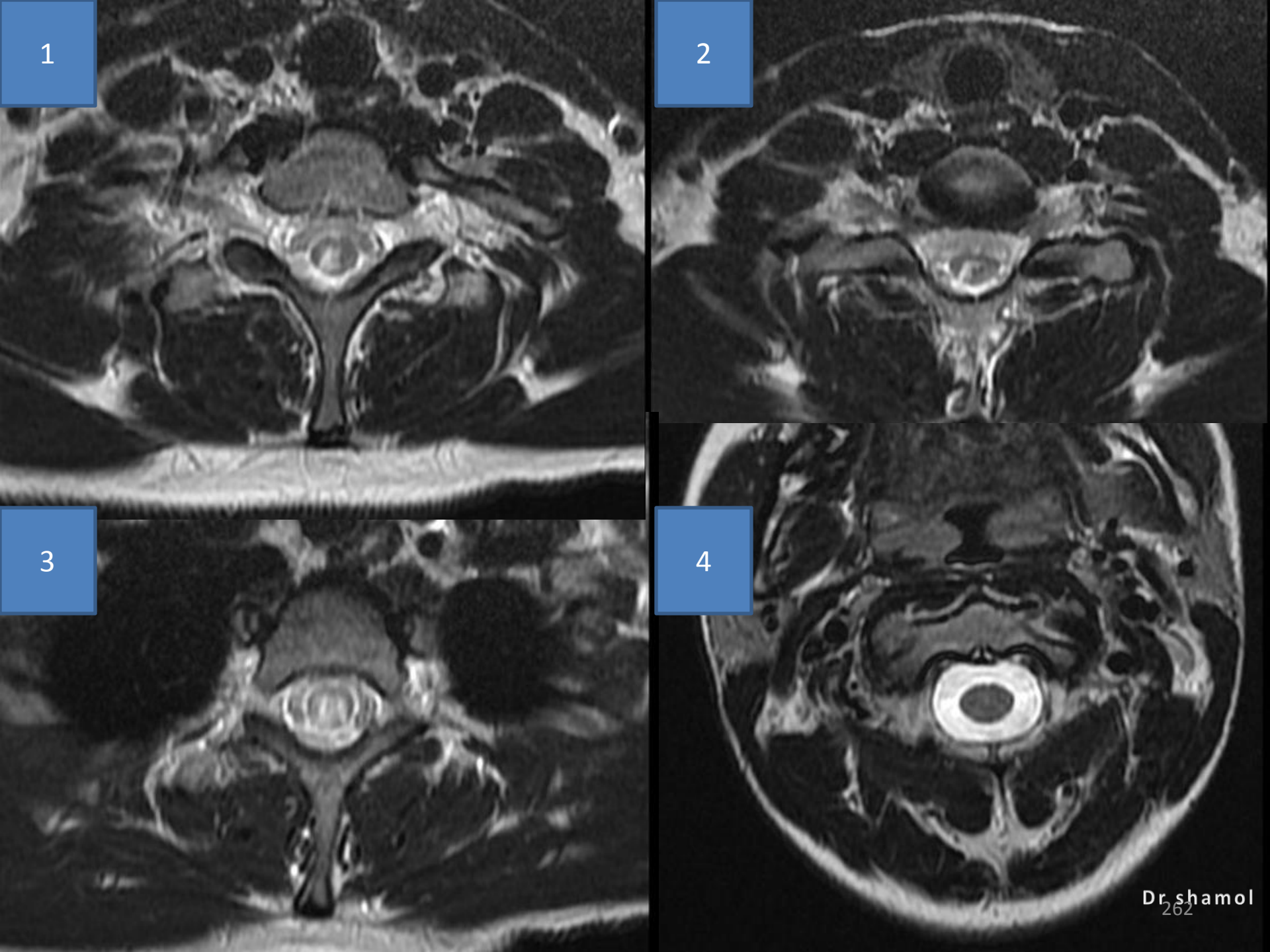
4



Acute transvers myelitis case #3

Dr shamol

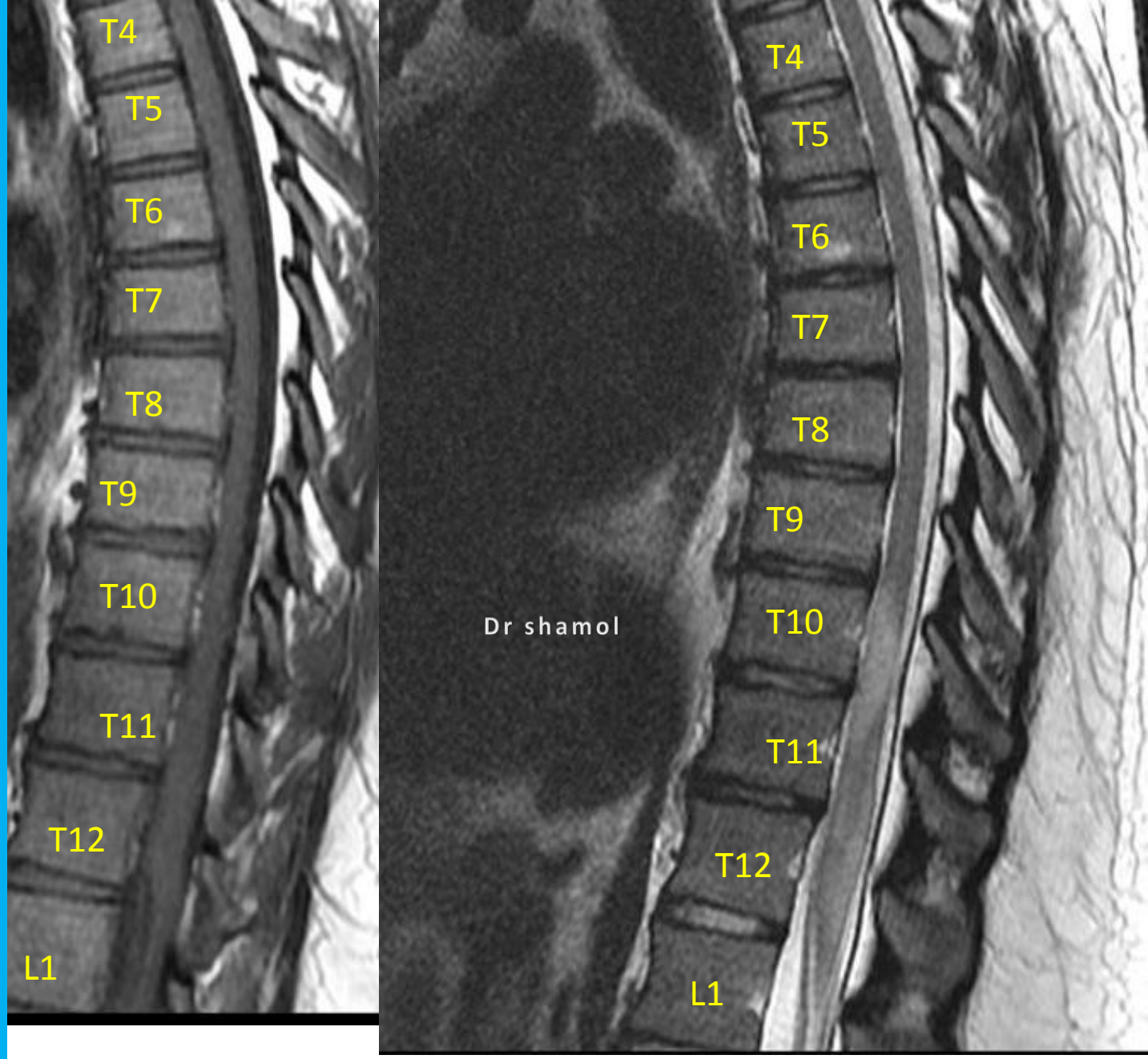

T1
T2
T1C+
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
L1
Extensive increased T2 signal and expansion of the cord is seen extending between C7 and T12. The T2 signal abnormality involves central grey matter and dorsal columns. Linear sagittally oriented enhancement is seen posteriorly within the cord in the mid and lower thoracic cord.
Dr shamol

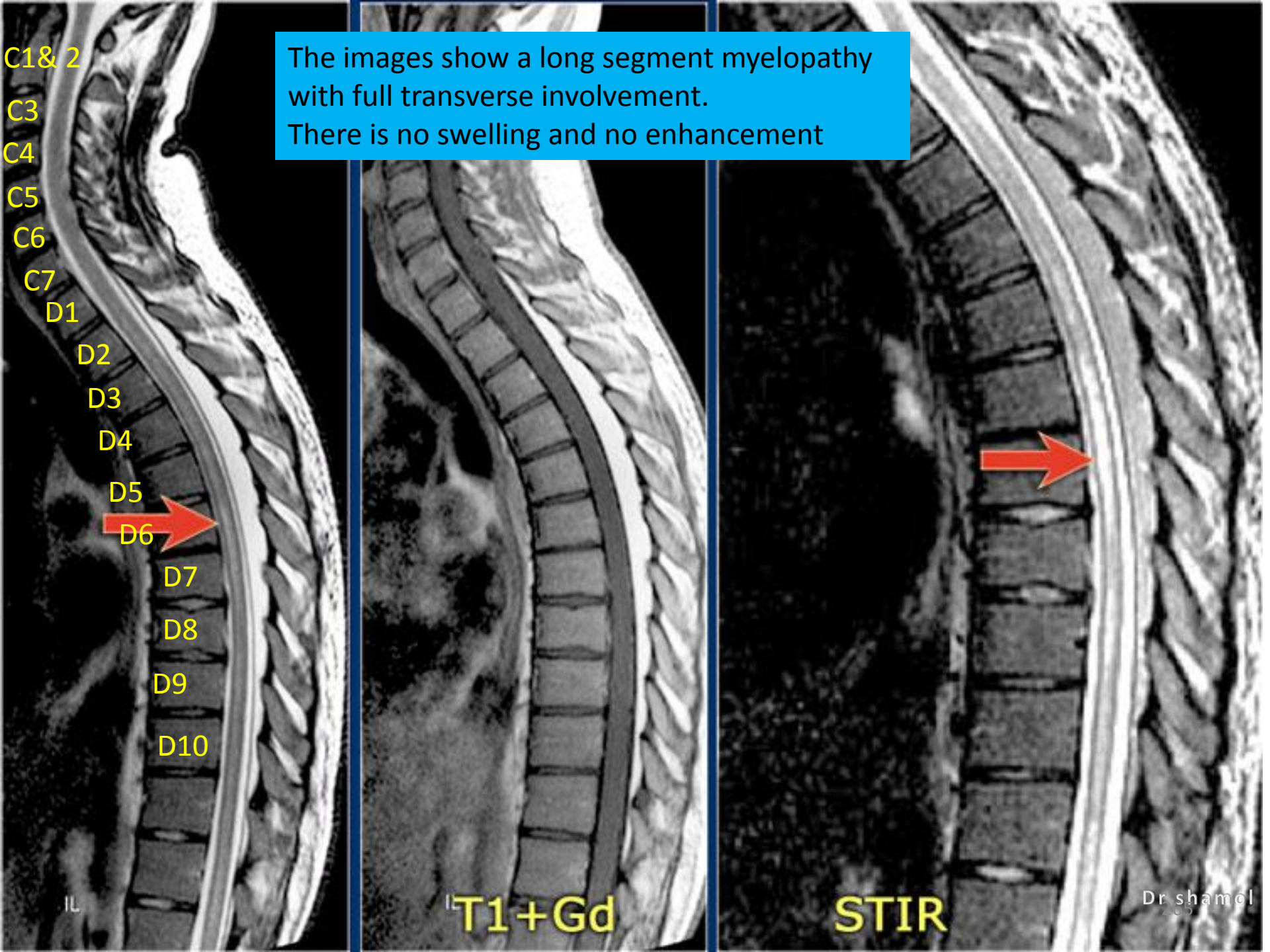

1
2
3
4
Dr shamol

Acute transvers myelitis case #4

Dr shamol

The lower thoracic cord from T10 to T12 is expanded and demonstrates an ill-defined T2 hyperintensity in two segments. At the level of the upper portion of T10 there is a ventral and then almost complete but mainly right-sided expansion and T2 signal change. It is isointense on T1. This ends at the lower half of the T11 vertebral body but there is a second area of involvement behind the T12 vertebral body extending down to the conus at the T12/L1 disc level




The images show a long segment myelopathy
with full transverse involvement.
There is no swelling and no enhancement
C1& 2
C3
C4
C5
C6
C7
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
T1+Gd
STIR
Dr shamol


Dr shamol
266
Dr sh

Focal inflammatory disorder of the spinal cord resulting in motor, sensory and autonomic dysfunction.

Imaging findings:

- More than 2/3 of the cross sectional area is involved.
- Focal enlargement.
- T2WI hyperintensity
- Enhancement + / -.

Two forms of TM:

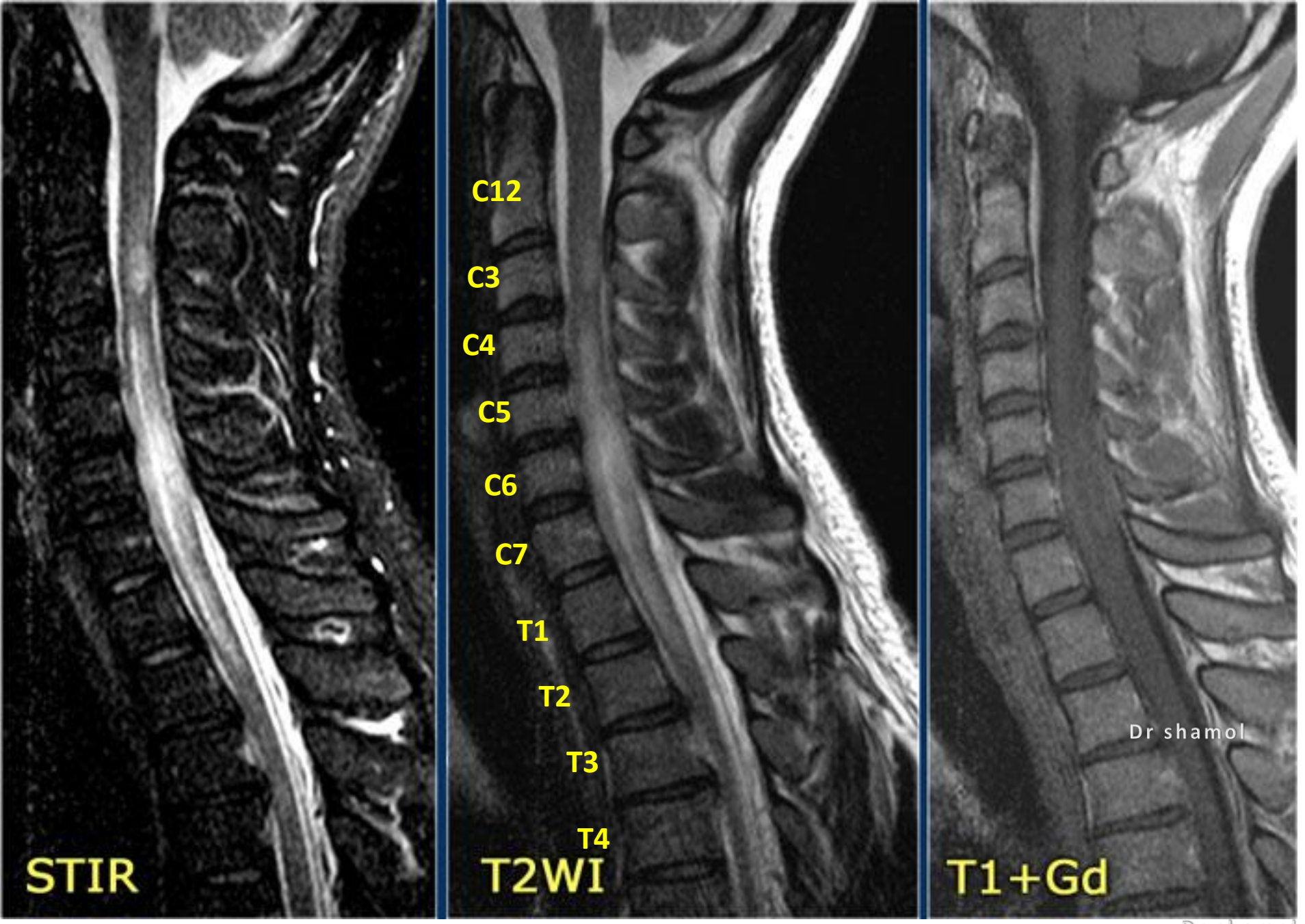
- *Acute partial transverse myelitis - APTM*
  - Lesions extending less than two Segments.
  - These patients are at risk of developing MS.
- *Acute complete transverse myelitis - ACTM*
  - Lesions extending more than two Segments .

The sagittal image shows a large segment of hyperintensity on T2WI.

The transverse image shows that most of the cord is involved.

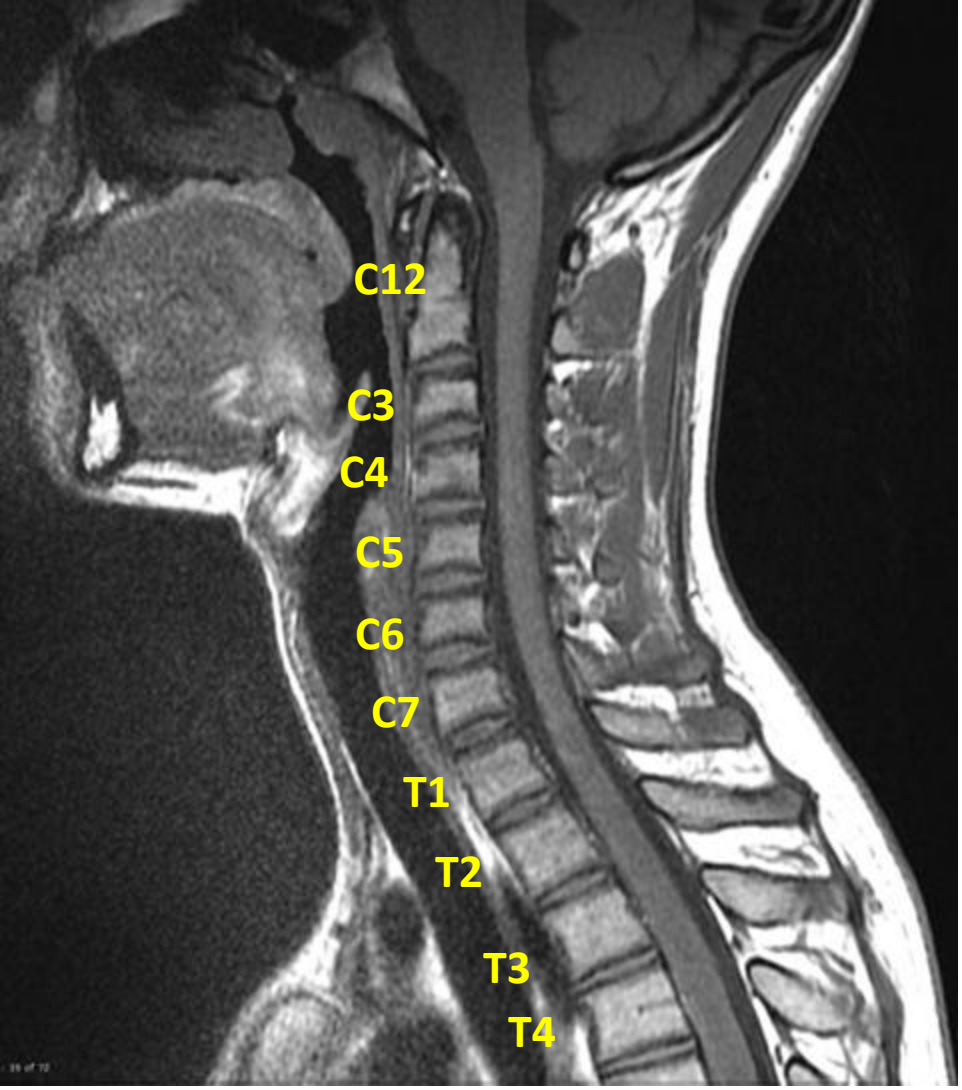
Acute transvers myelitis case #5

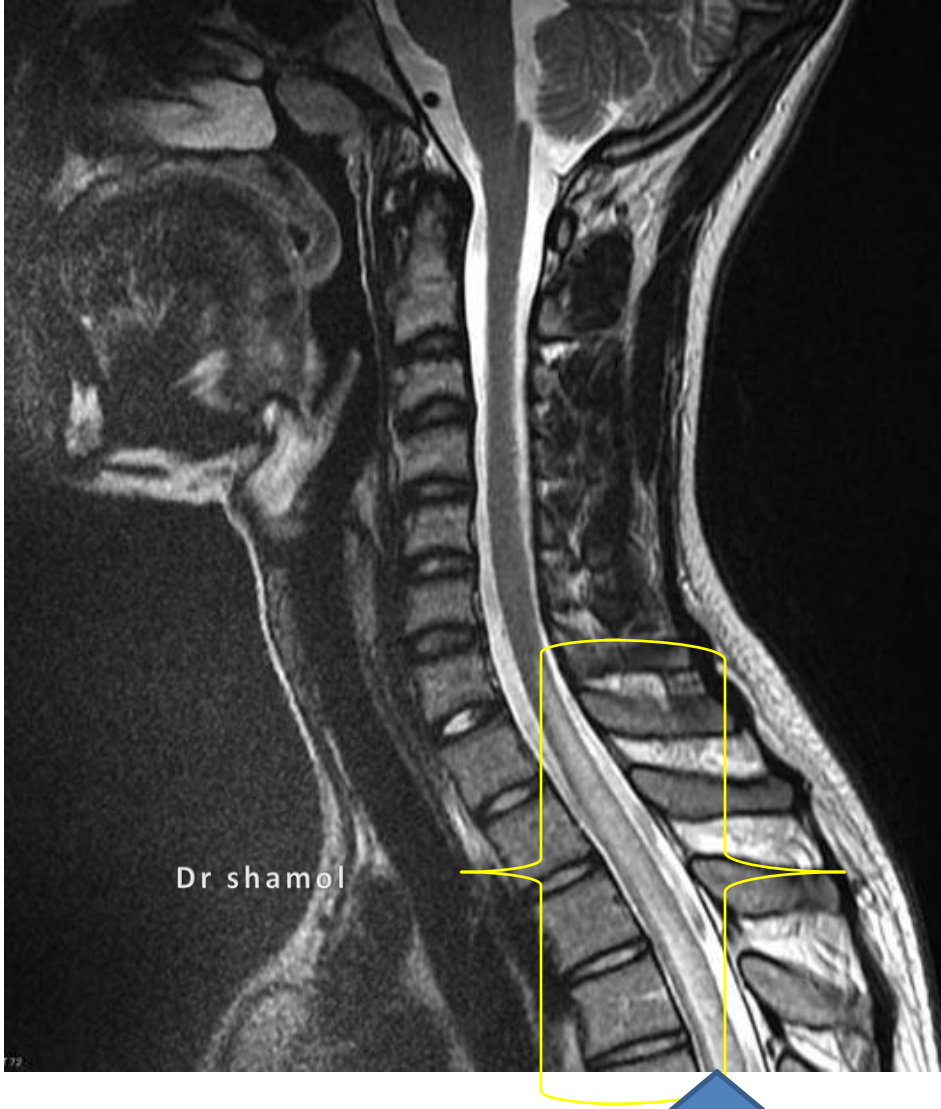
Dr shamol

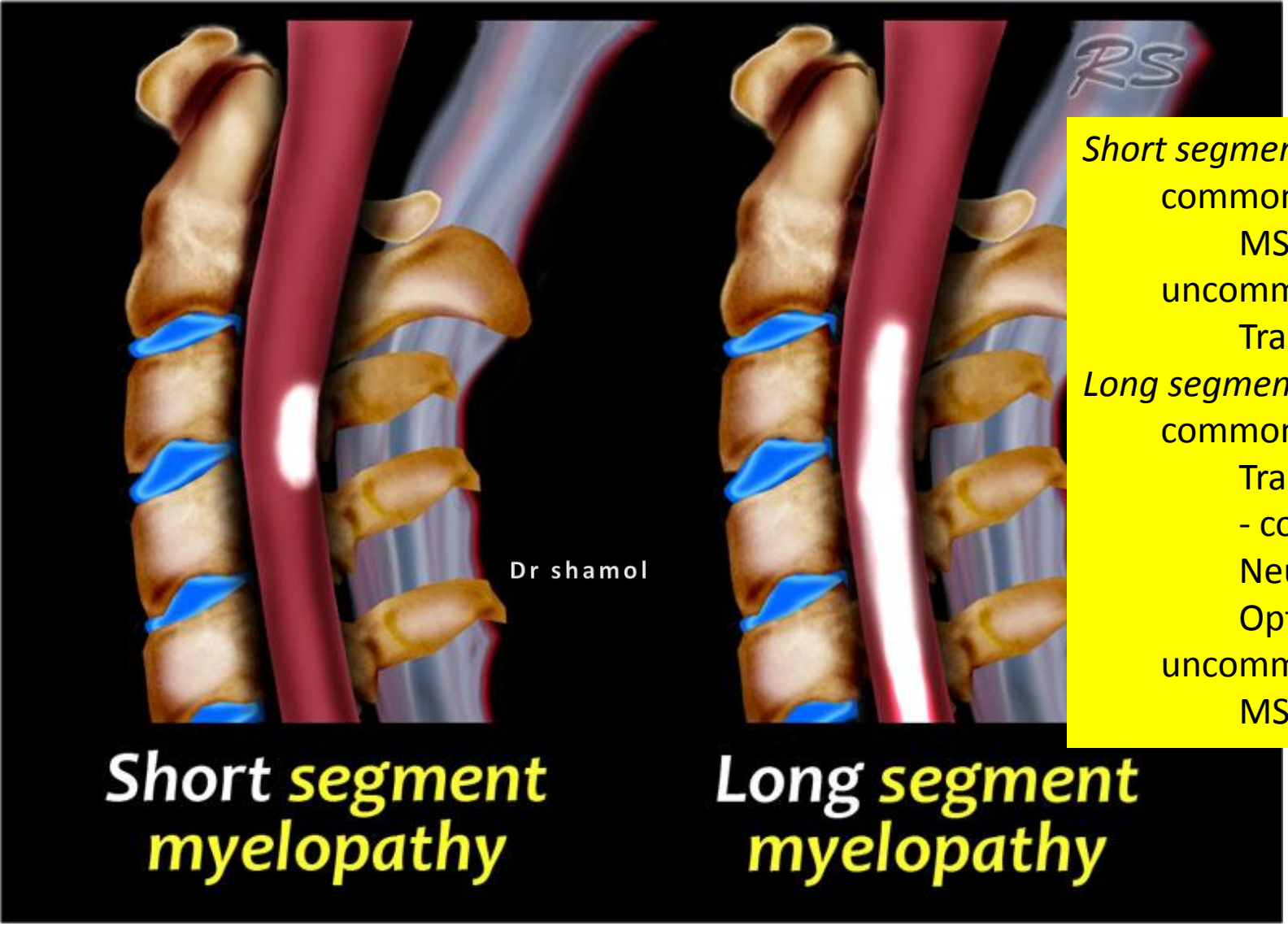

C12
C3
C4
C5
C6
C7
T1
T2
T3
T4
STIR
T2WI
T1+Gd
Dr shamol

Acute transvers myelitis case #6

Dr shamol


C12
C3
C4
C5
C6
C7
T1
T2
T3
T4


Dr shamol
Signal changes



Short segment involvement

common in:

MS

uncommon in:

Transverse myelitis

Long segment involvement

common in:

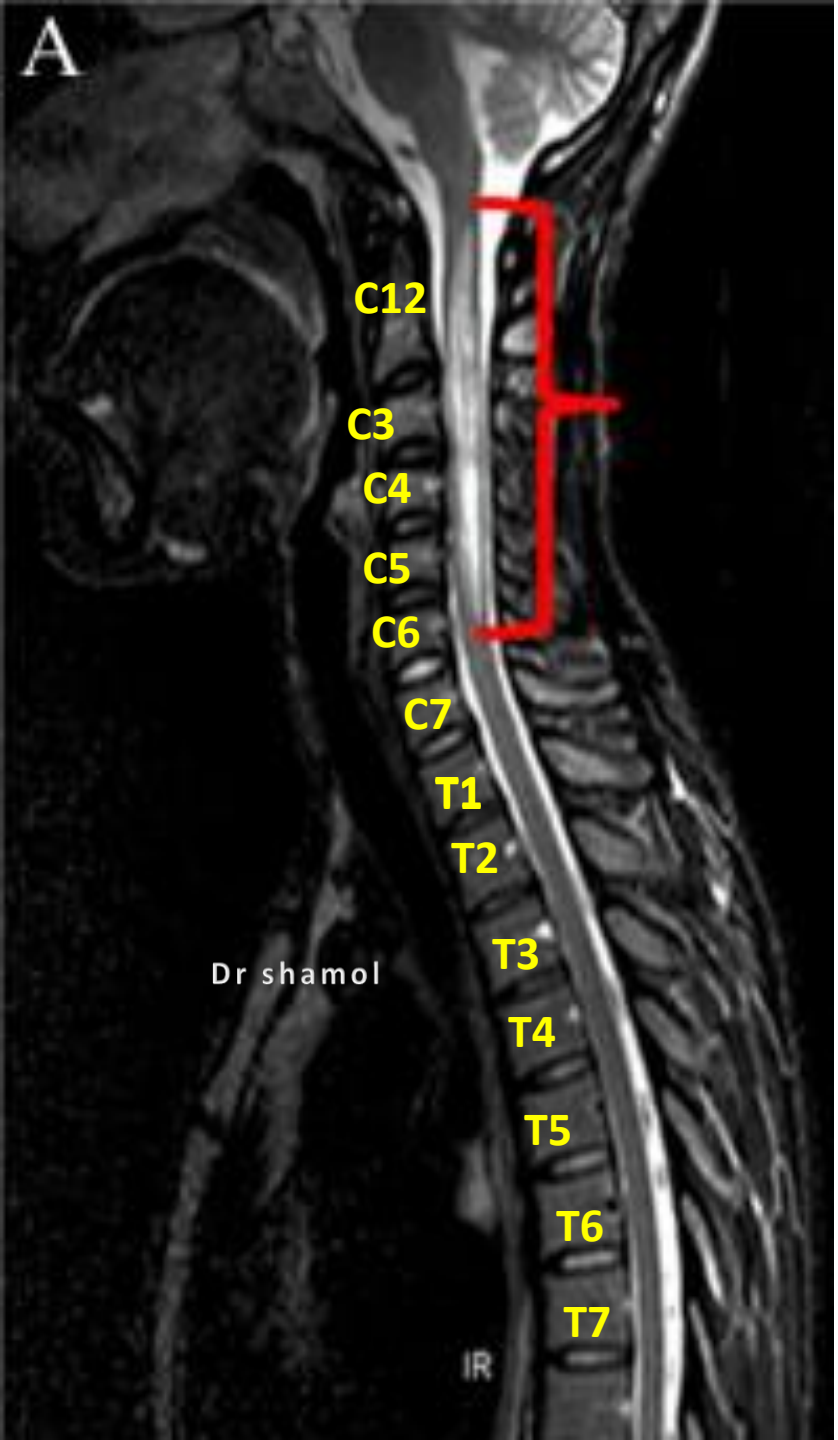
Transverse myelitis - complete form

Neuromyelitis Optica

uncommon in:

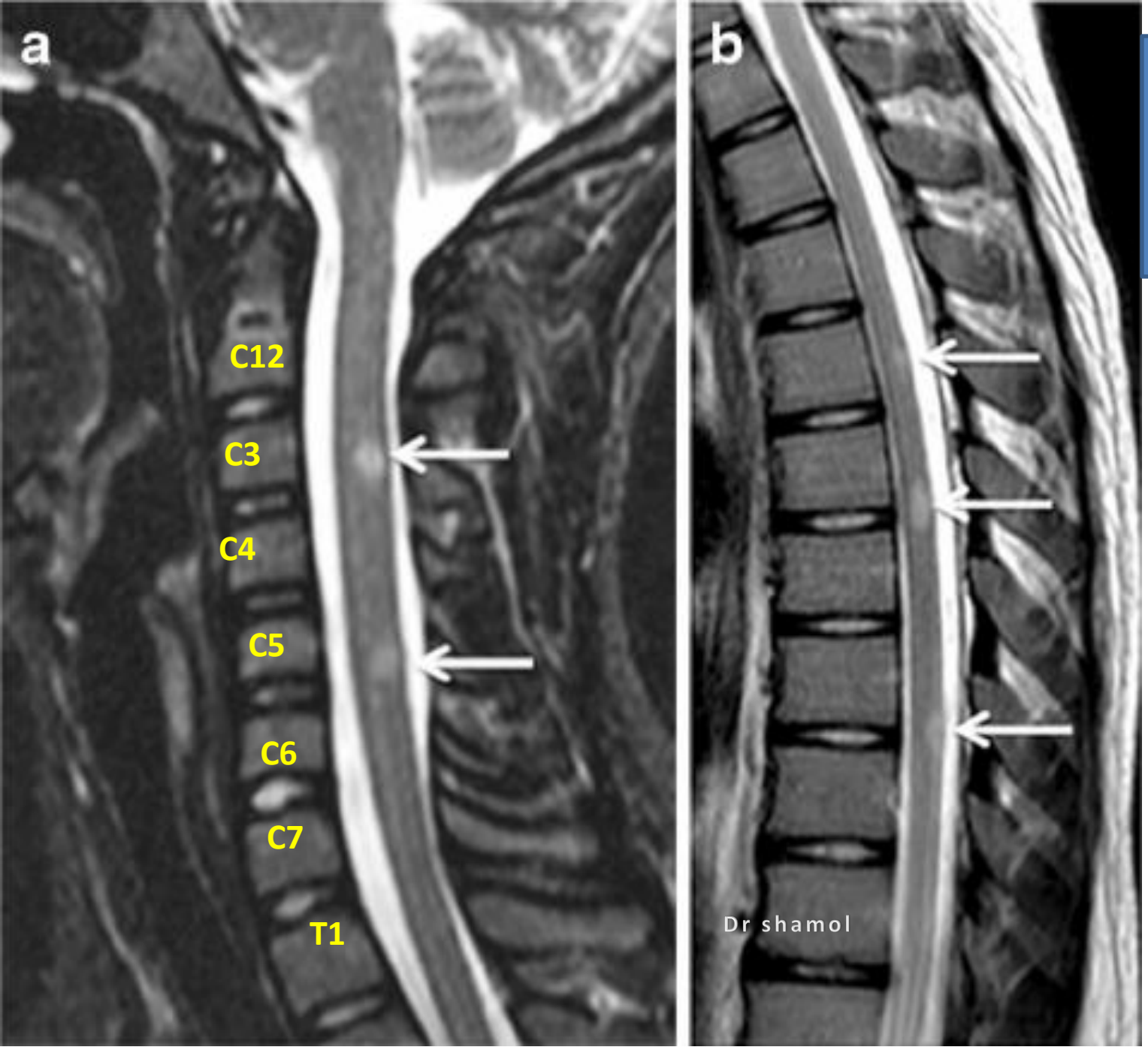
MS

Dr shamol

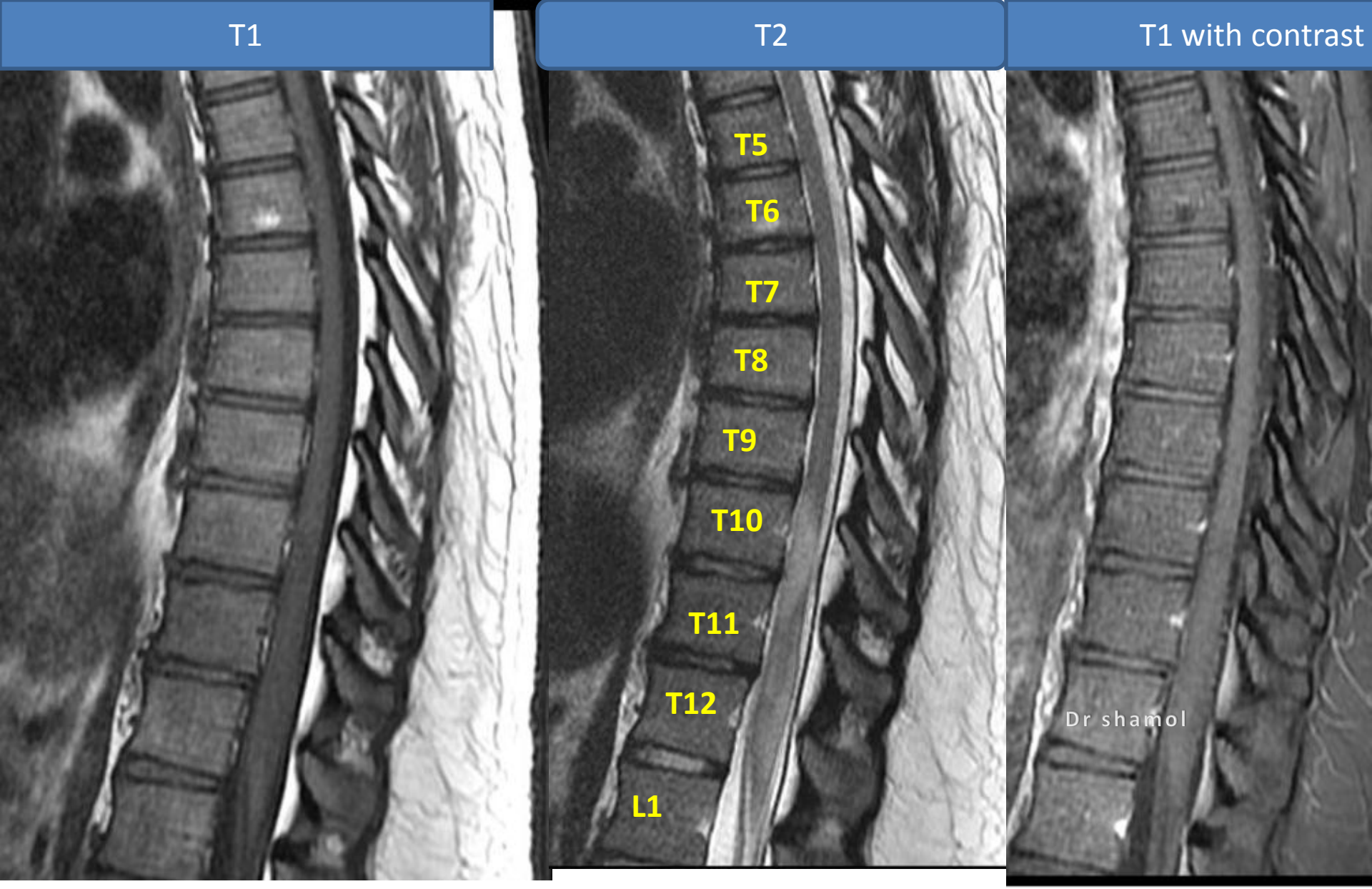

A
C12
C3
C4
C5
C6
C7
T1
T2
T3
T4
T5
T6
T7
Dr shamol
IR

MS CASE #1

Dr shamol

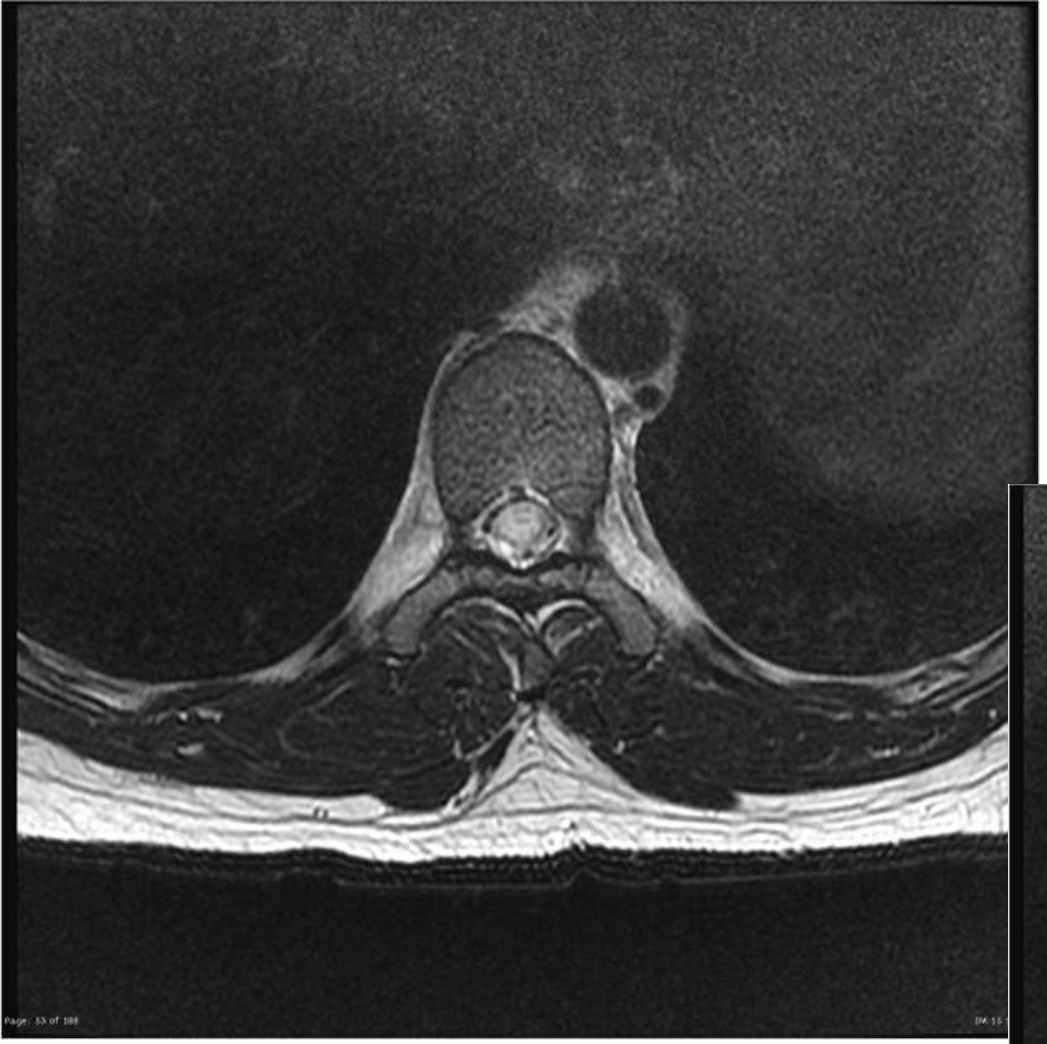


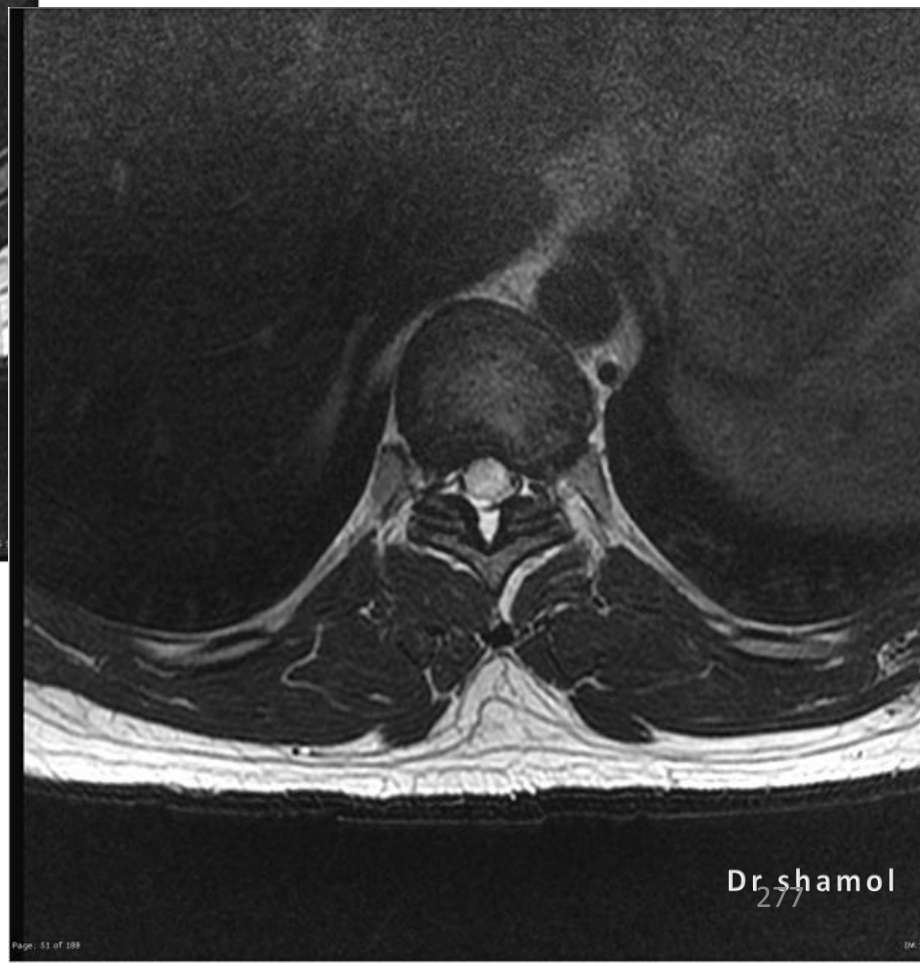
M S



ill-defined hyperintensity in two segments. T10 to T12 in T2
No contrast enhancement is present.

Dr shamol

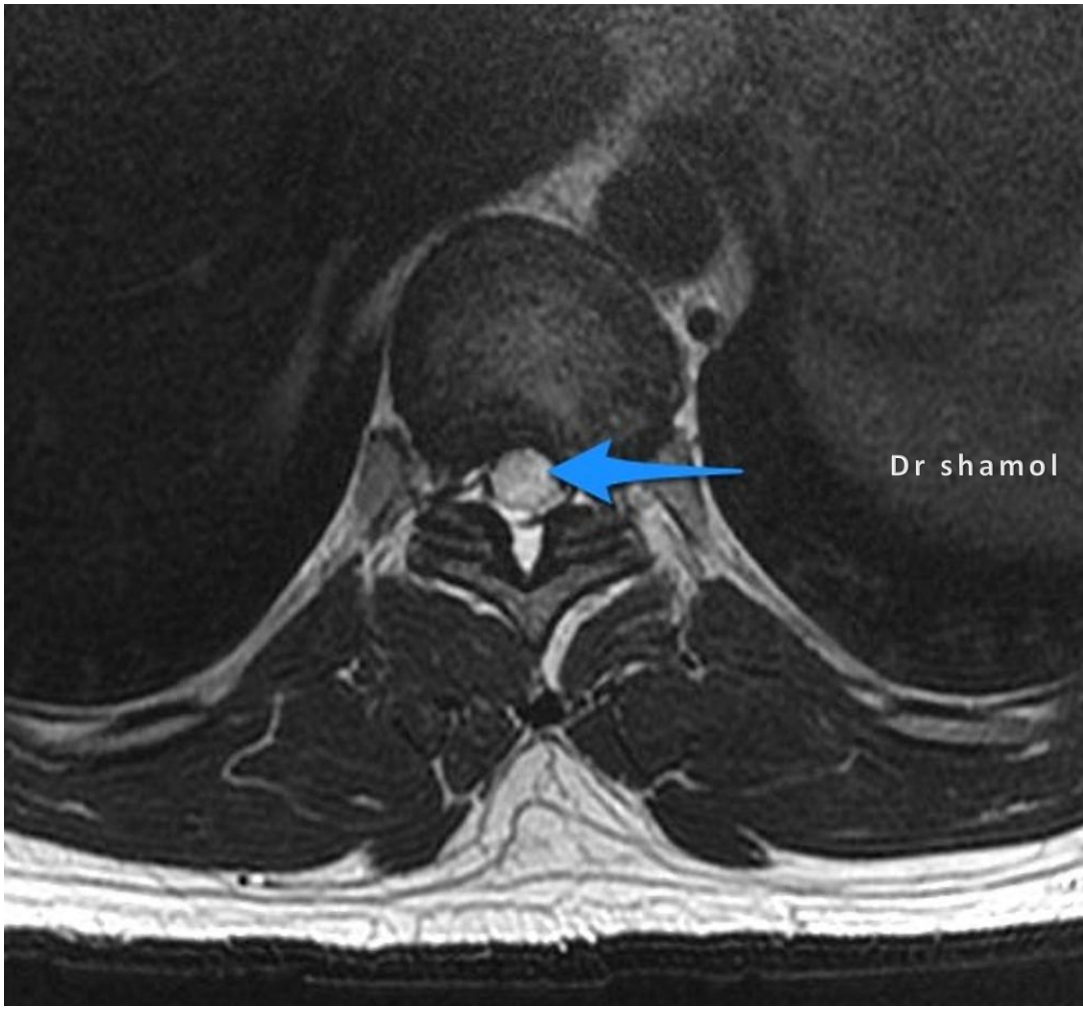

Page: 53 of 108


Page: 53 of 108
Dr shamol

MS CASE #2

Dr shamol





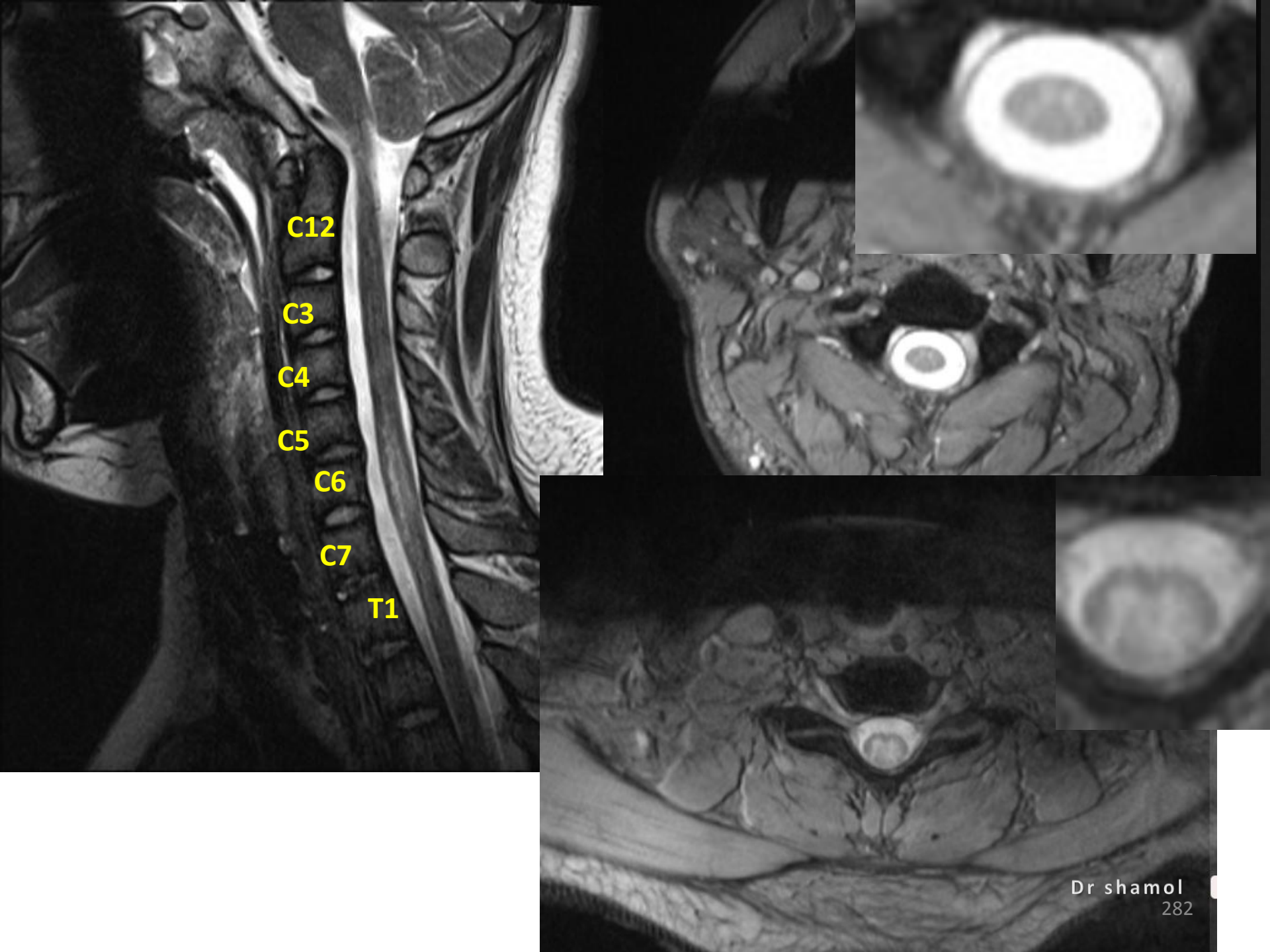
Dr shamol

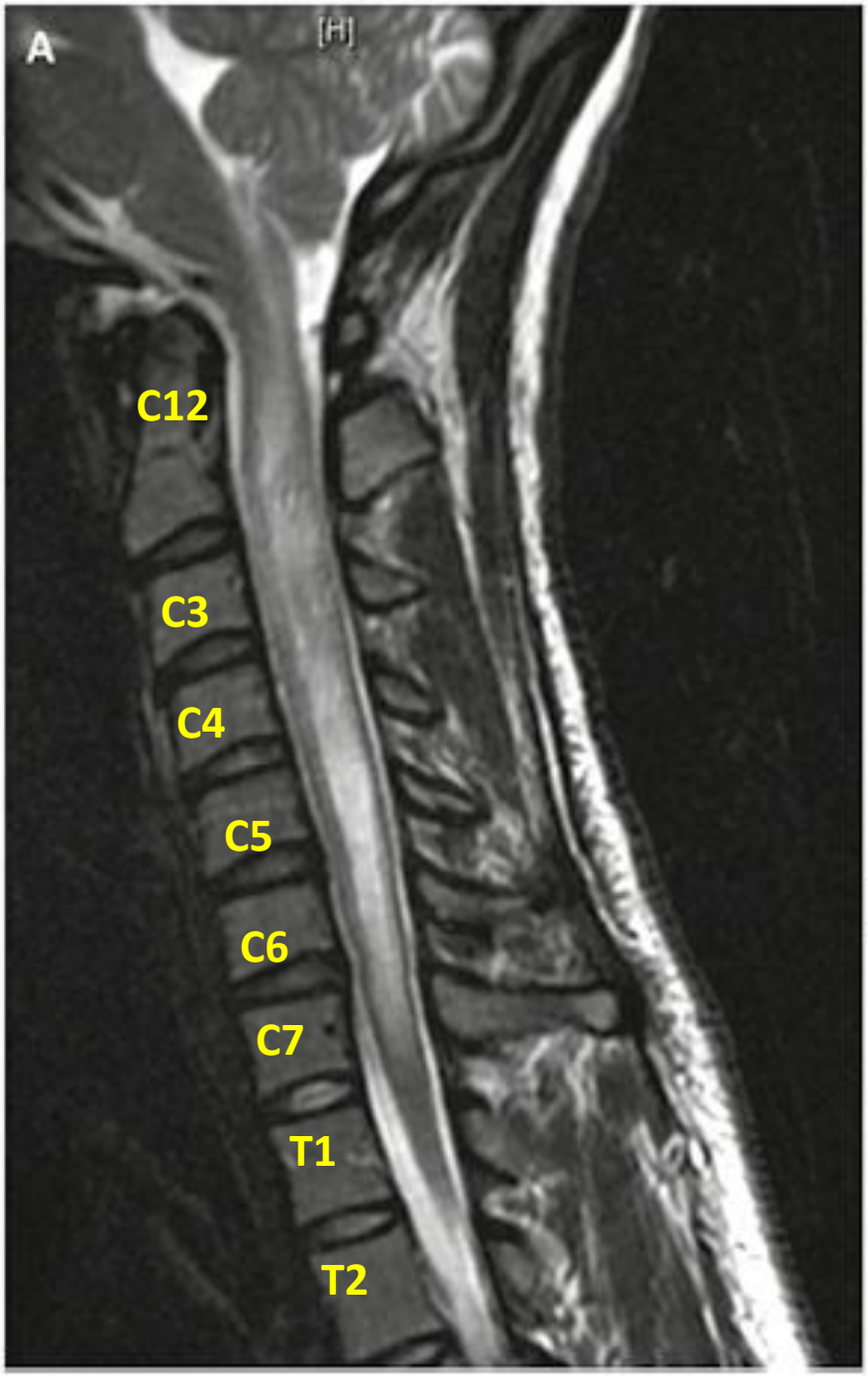


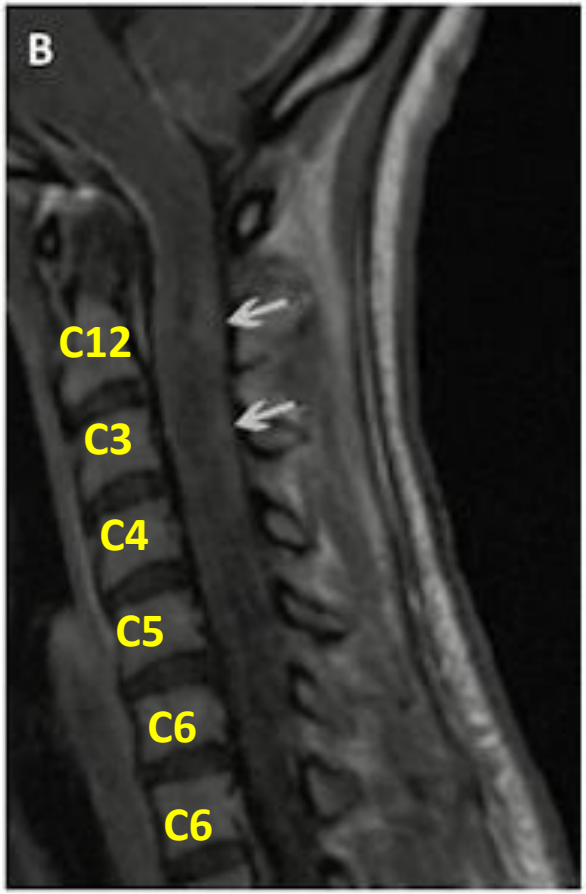
T1 | T2 | T1 with contrast

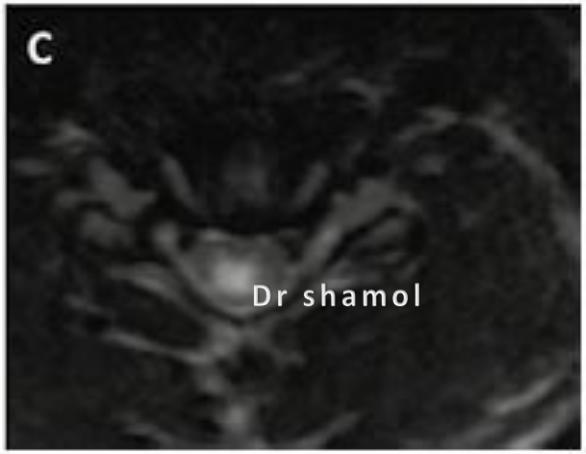
MS CASE #3

Dr shamol


C12
C3
C4
C5
C6
C7
T1
Dr shamol
282

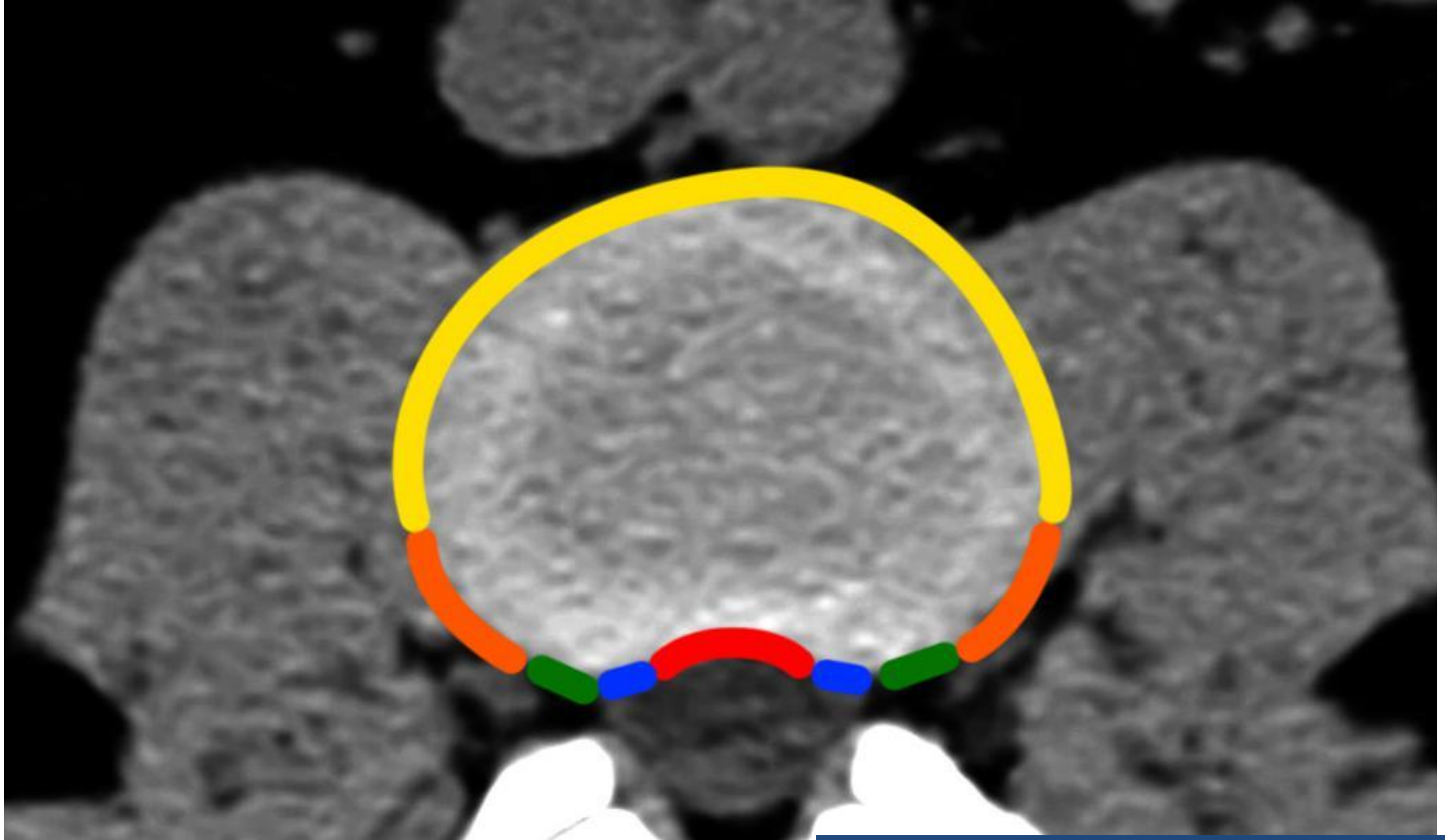






Dr shamol

Localization of disc herniation
Axial localisation
Sagittal localisation

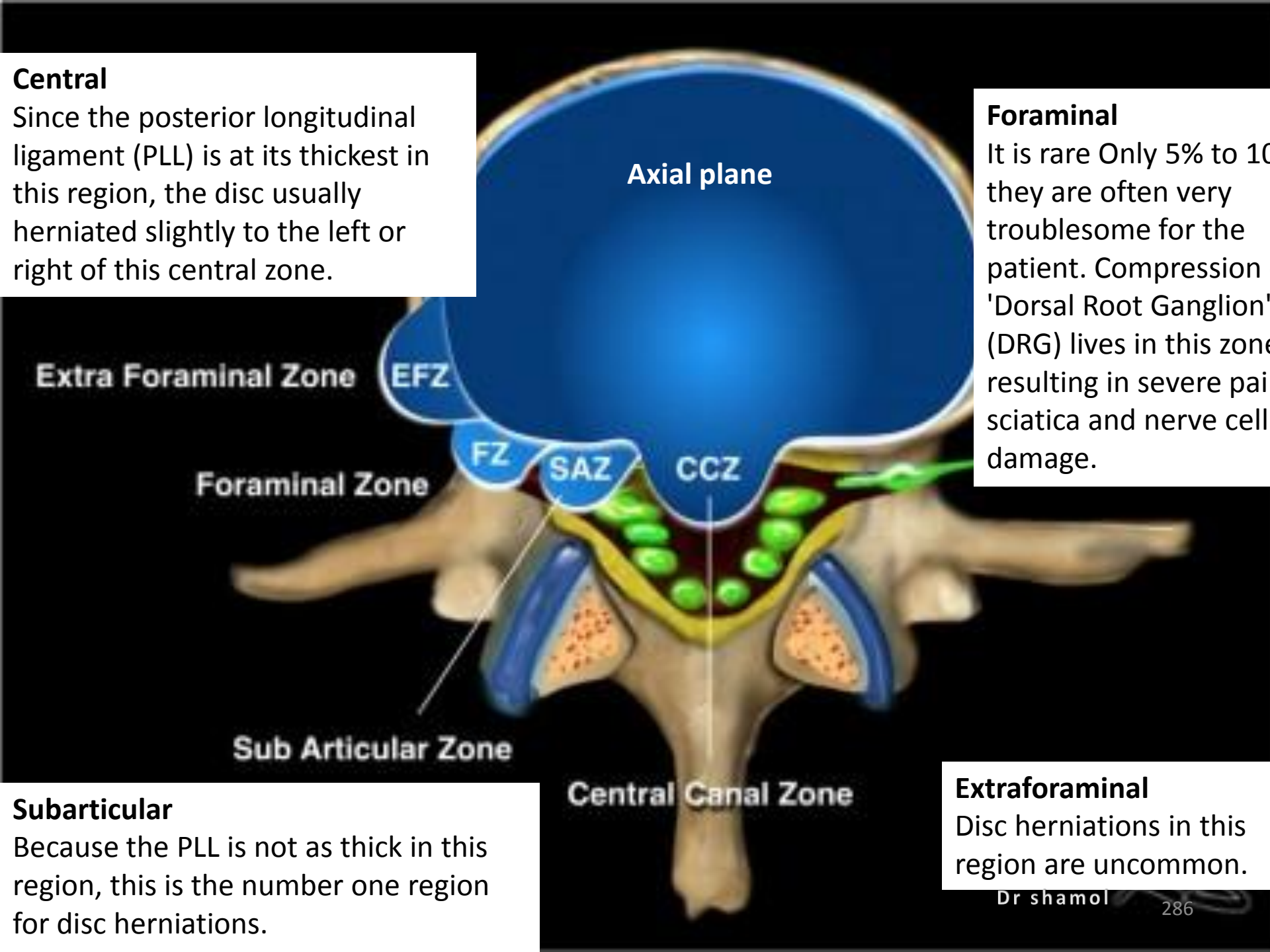


Axial localisation

Most sizable disc herniations will occupy more than one zone:

- ❖central
- ❖subarticular, also known as lateral recess and paracentral
- ❖foraminal
- ❖**extraforamina**l, also known as lateral or far lateral
- ❖anterior

Central
Since the posterior longitudinal ligament (PLL) is at its thickest in this region, the disc usually herniated slightly to the left or right of this central zone.

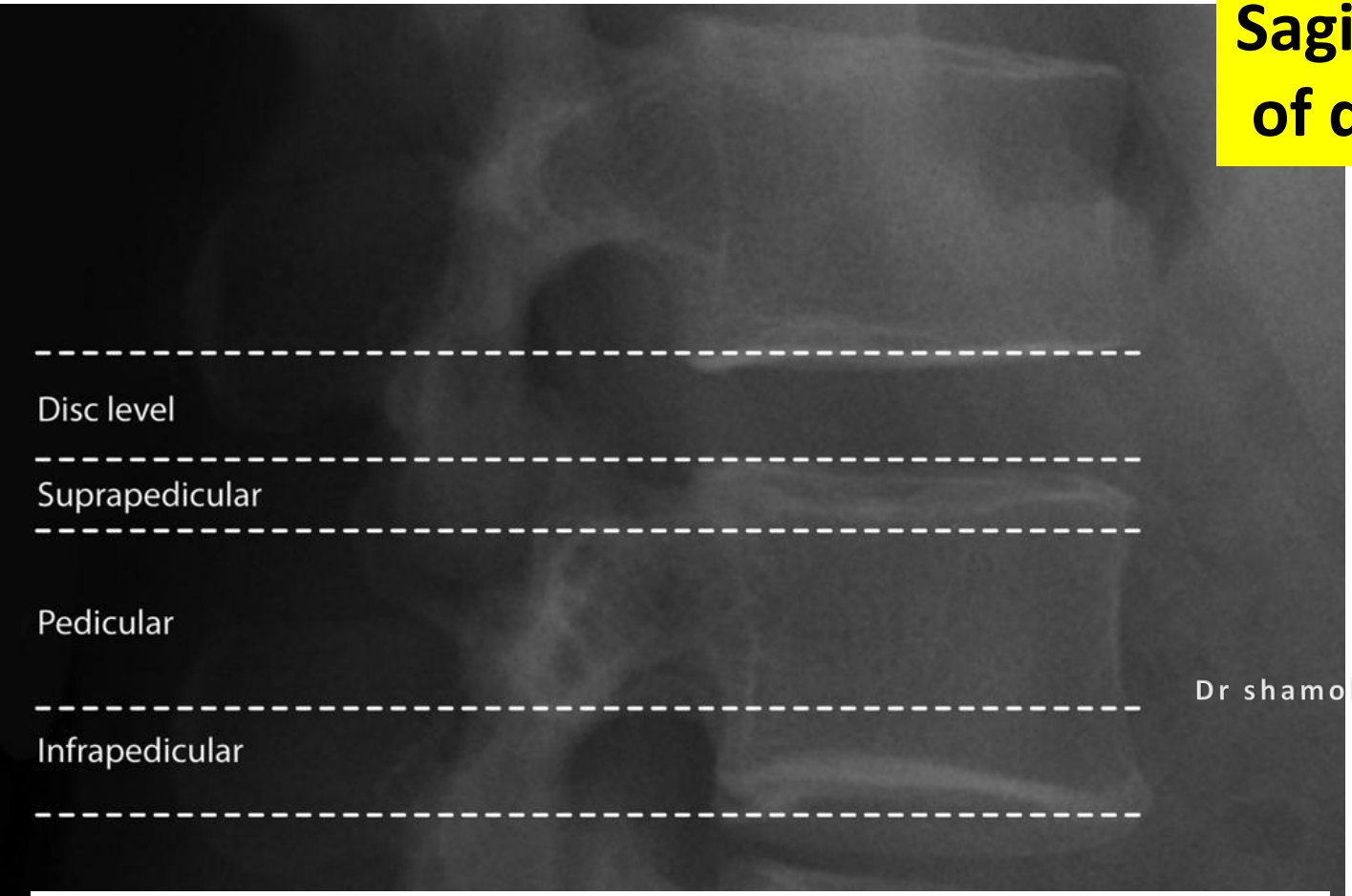


Foraminal
It is rare Only 5% to 10 they are often very troublesome for the patient. Compression 'Dorsal Root Ganglion' (DRG) lives in this zone resulting in severe pai sciatica and nerve cell damage.

Subarticular
Because the PLL is not as thick in this region, this is the number one region for disc herniations.

Extraforaminal
Disc herniations in this region are uncommon.

Sagittal localisation of disc disease



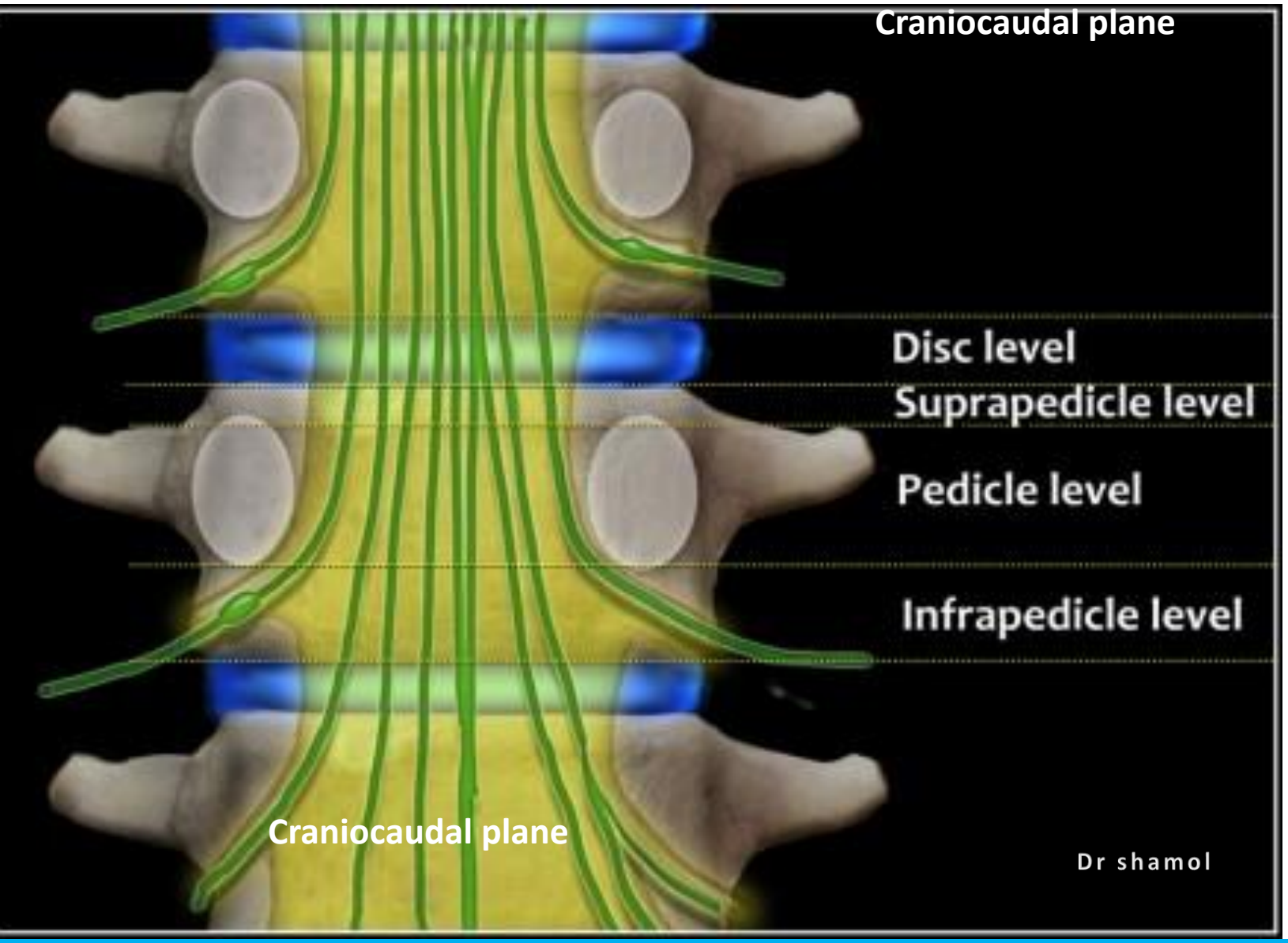
The pedicle and disc are used as reference points to describe disc herniations which may extend to:

disc level - confined to between the vertebral endplates

suprapedicular - between superior endplate and superior border of pedicle

pedicular - at the level of the pedicle

infrapedicular - below lower margin of the pedicle to the inferior endplate

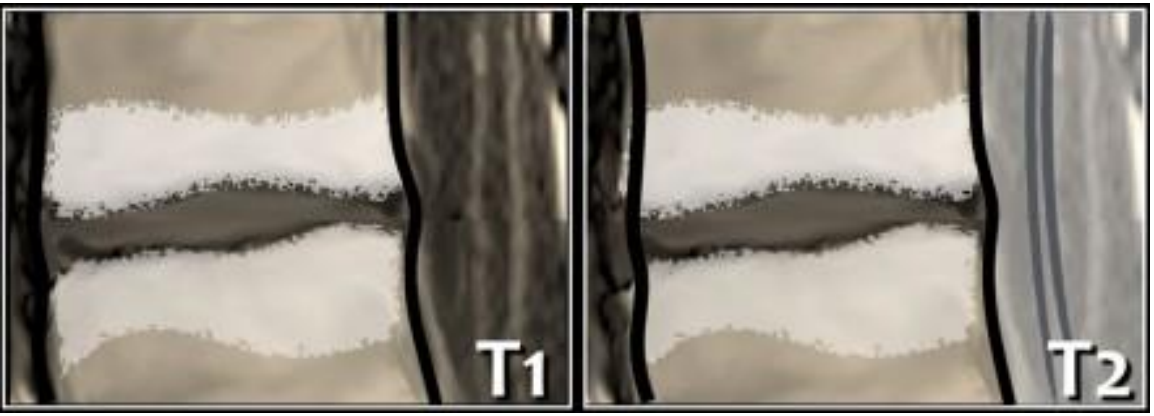


In the craniocaudal plane disc herniations are described as at disc level, suprapedicular level, pedicular level and infrapedicular level.

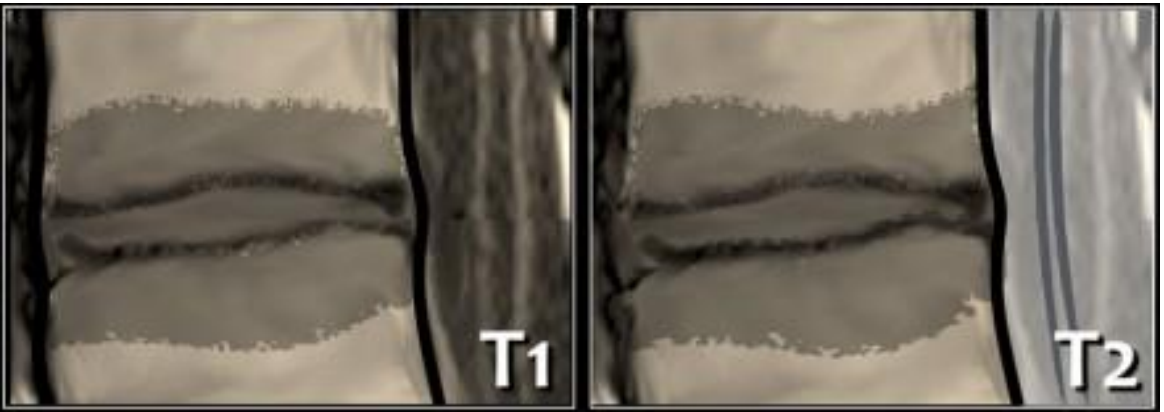
Abnormal changes in the vertebral body



Modic Type 1(hypo-hyper)
T1WI→low signal/ hypo intensity
T2WI→ high signal/ hyper intensity
It representing fibrovascular tissue, inflammatory changes, and perhaps edema.Type I changes may be chronic or acute.There is a correlation between low back pain and Modic changes, especially type 1



Modic Type 2(hyper –hyper)
T1WI→ high signal/ hyper intensity
T2WI→ high signal/ hyper /iso intensity
It representing bone marrow replacement by fat.



Modic Type 2(hypo –hypo)
T1WI→ low signal/ hypo intensity
T2WI→ low signal/ hypo intensity
It representing reactive sclerosis

Dr shamol

Fissure

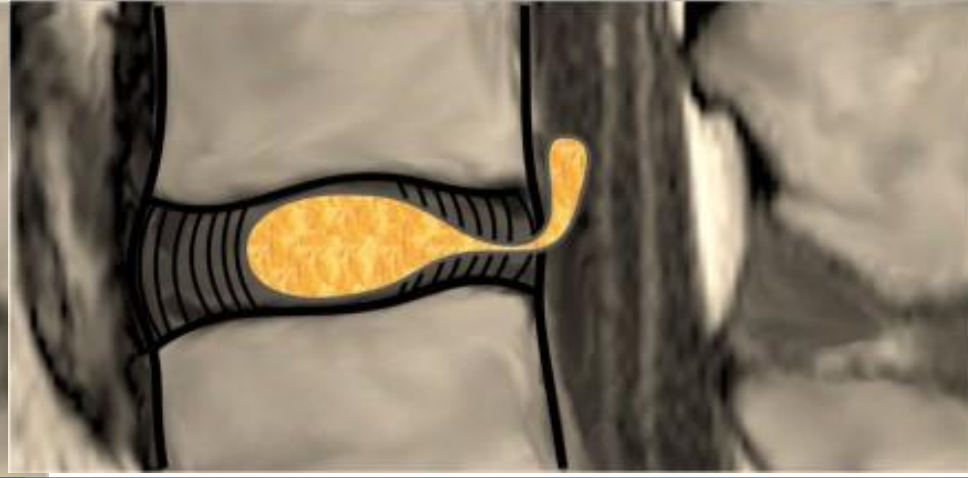
Migration

Sequestration

Intravertebral herniation

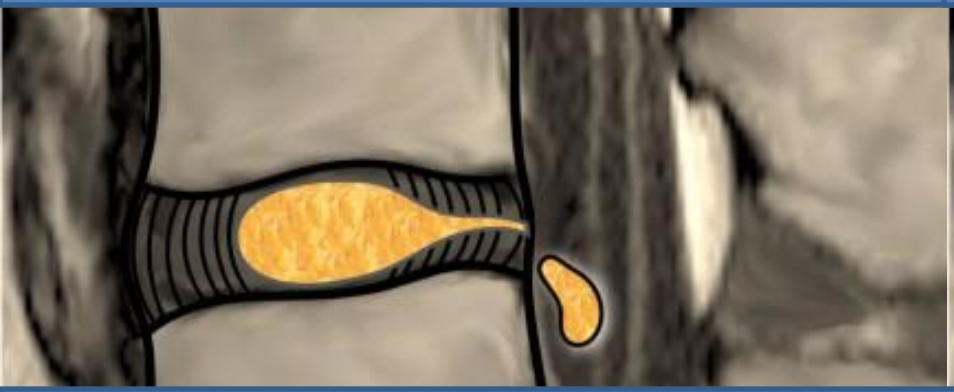


Annular fissures are separations between annular fibers, seen as high intensity zones on T2W-images representing fluid or granulation tissue and may enhance with gadolinium



Migration

Migration indicates displacement of disc material away from the site of extrusion, regardless of whether sequestrated or not.



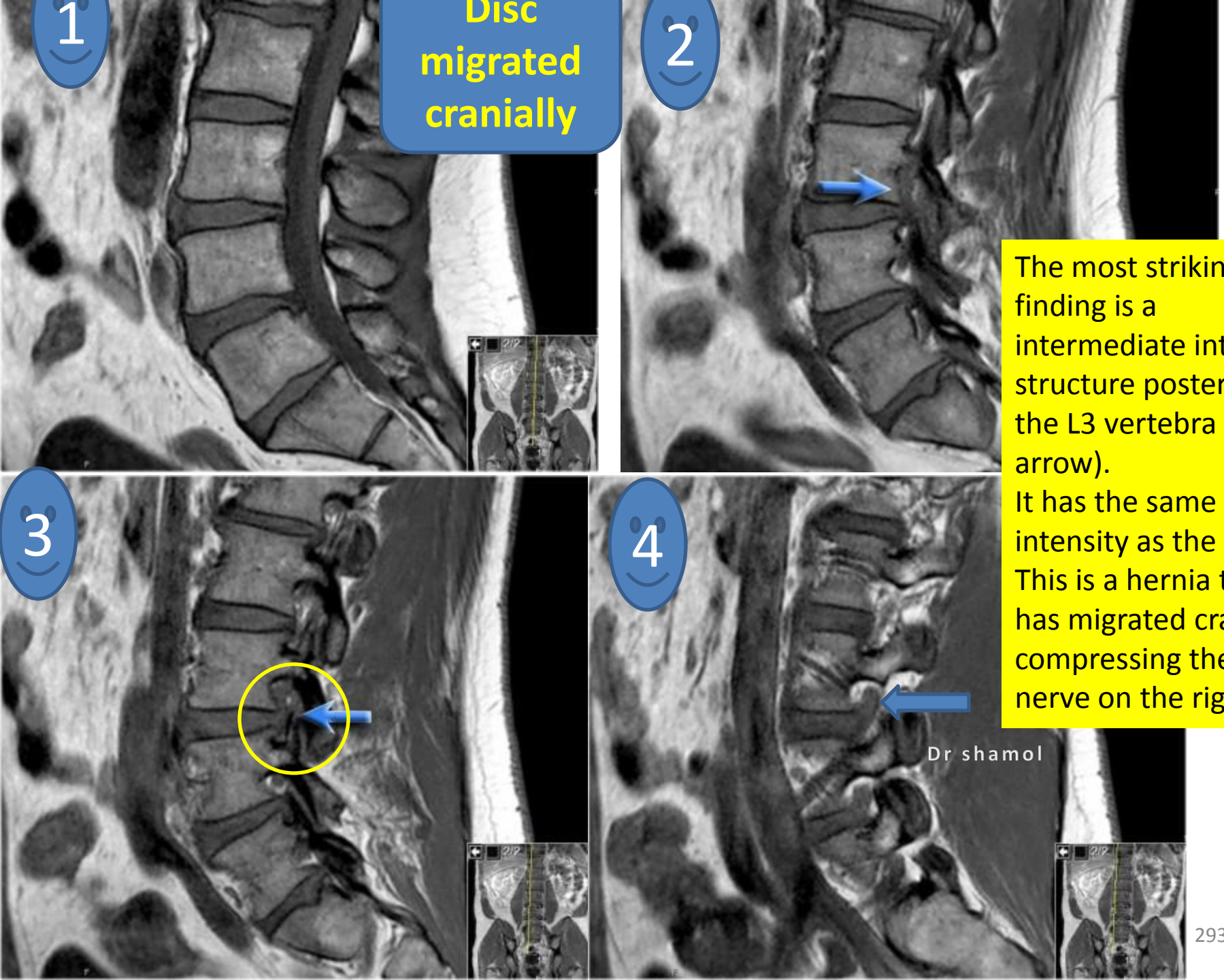
Sequestration

The term sequestration is used to indicate that the displaced disc material has lost continuity with the parent disc.



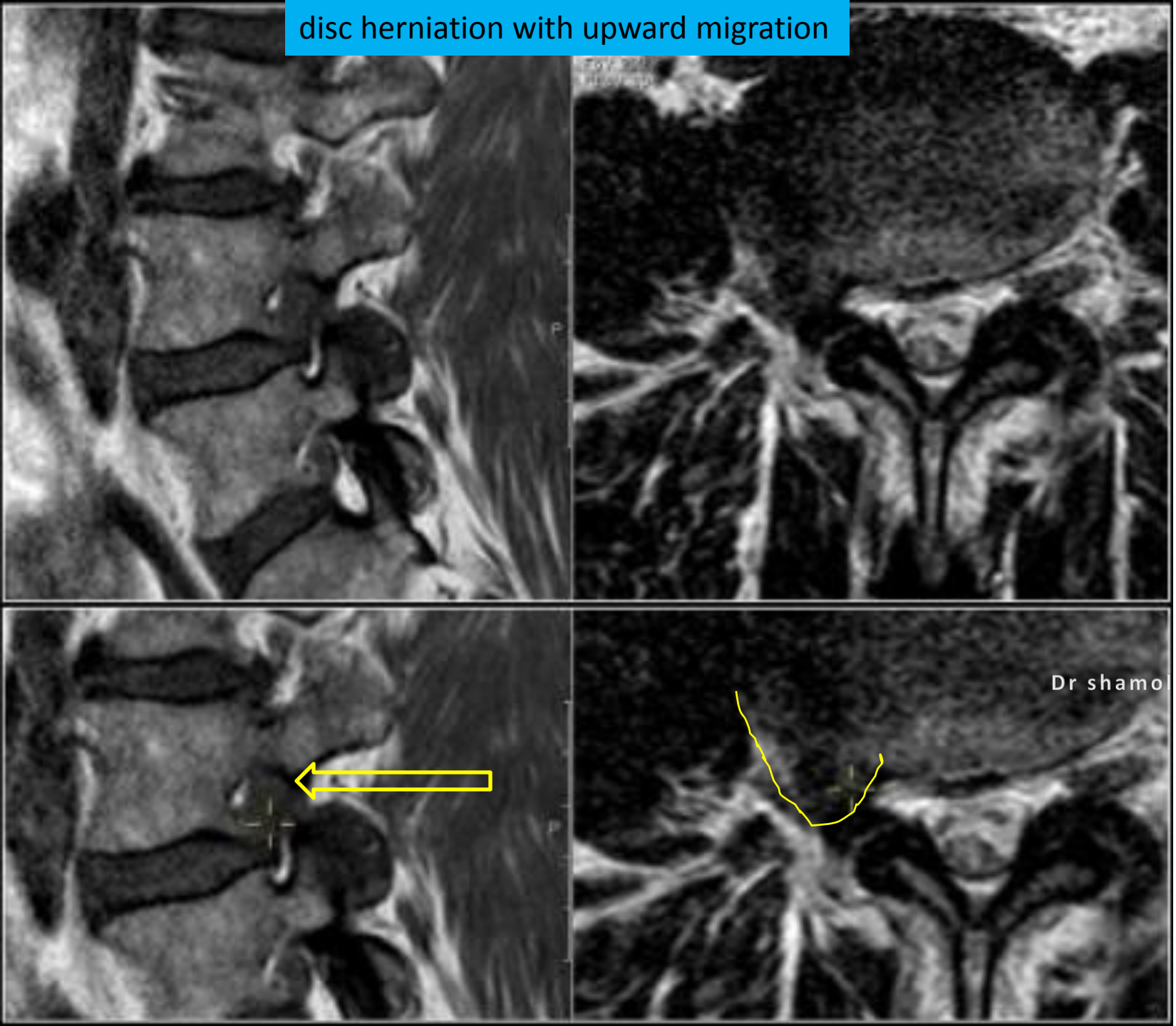
Intravertebral herniation

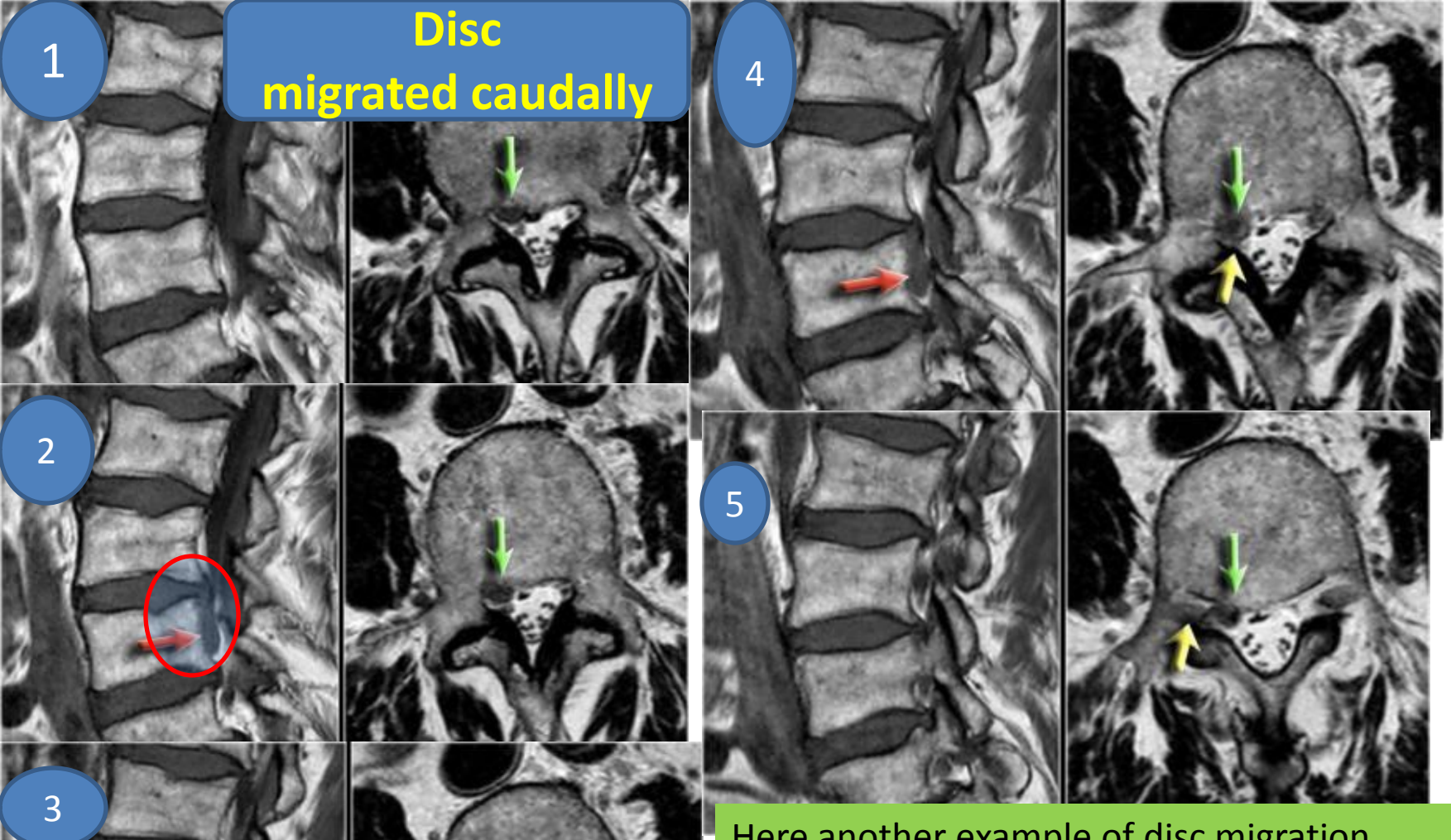
Intravertebral herniation or Schmorl node is herniation of disc material in the vertical direction through a gap in the vertebral end plate



The most striking finding is a intermediate intensity structure posterior to the L3 vertebra (blue arrow).
It has the same signal intensity as the disc.
This is a hernia that has migrated cranially compressing the L3 nerve on the right side

disc herniation with upward migration





Here another example of disc migration.
Notice how the disc herniation at the L3L4 level migrates behind the body of L4.

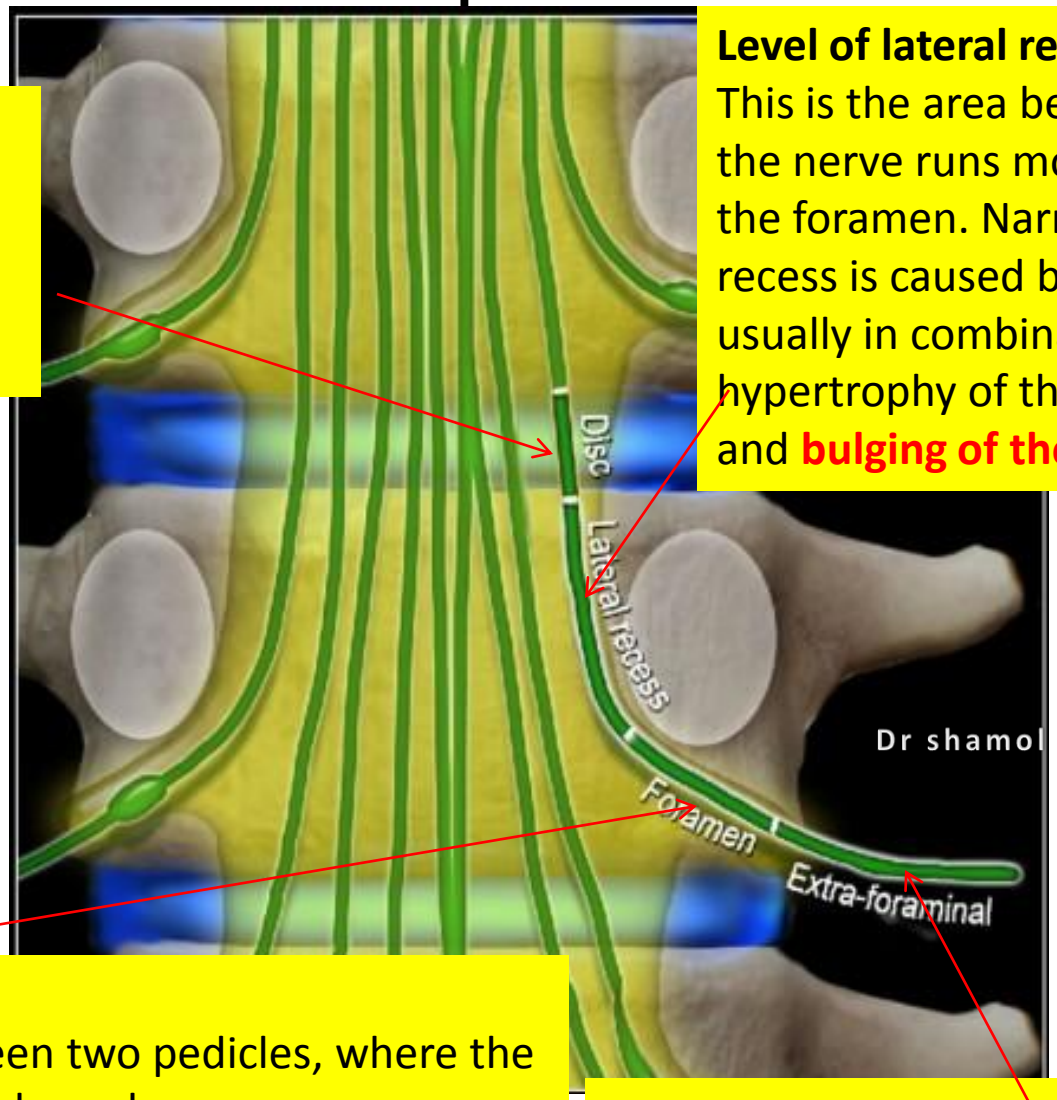
Dr shamol

Notice that at the L4L5 level the migrated disc simulates a nerve root (green arrow), while in fact the nerve is compressed posteriorly and subsequently moves to the foramen (yellow arrow).

Nerve roots compression

Nerve root compression occur in four levels

Disc level.
Mostly by **herniated discs** and less frequently due to **spinal stenosis**

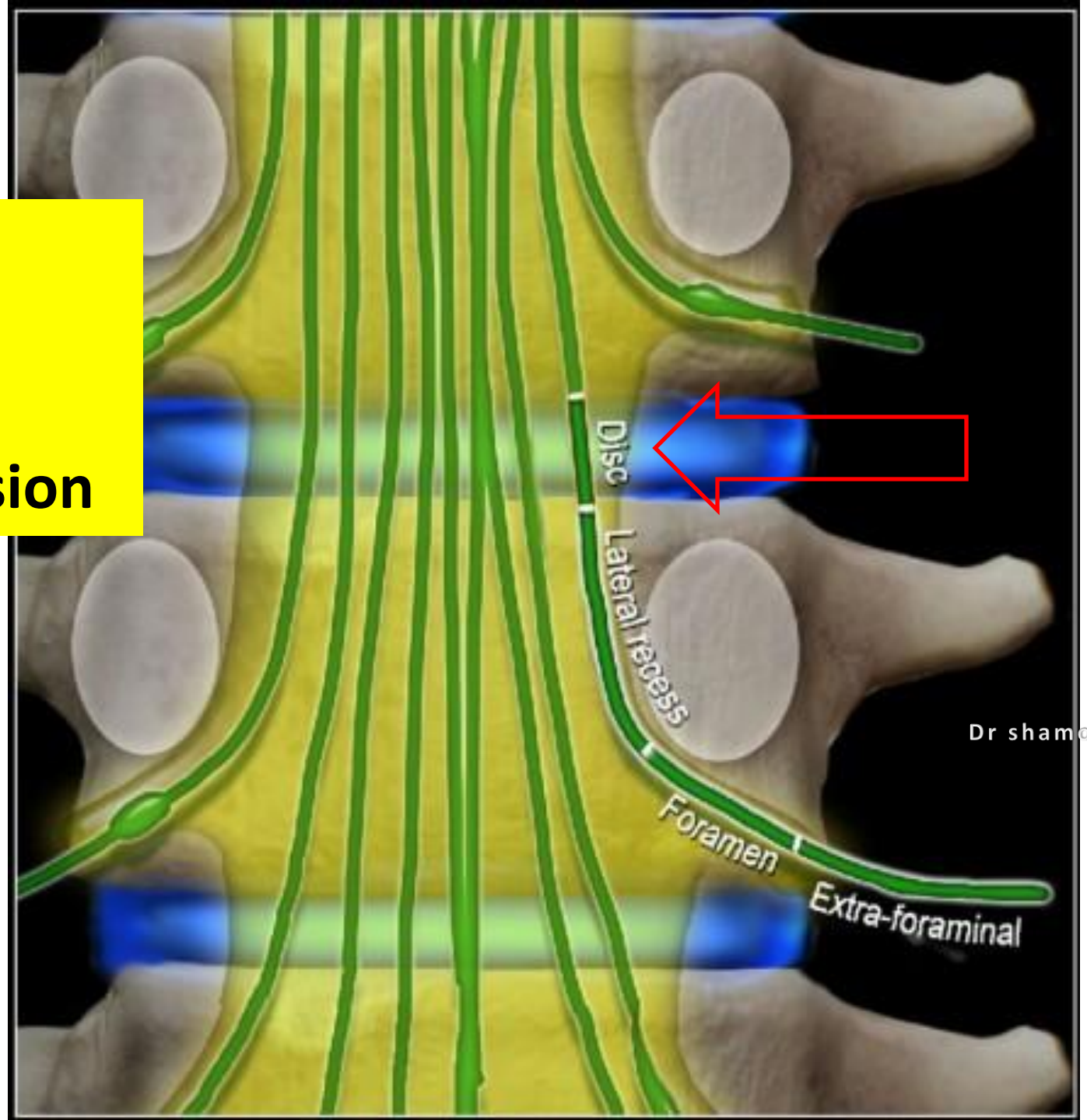


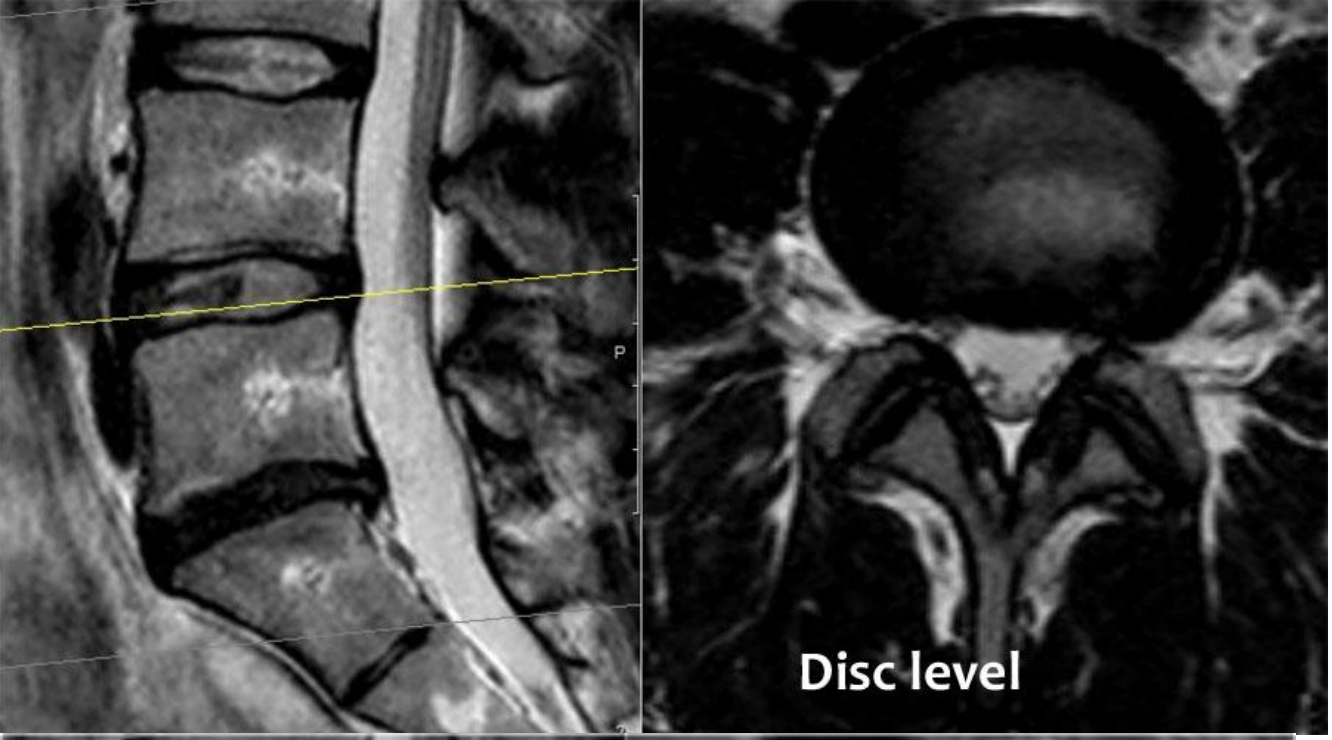
Level of lateral recess.
This is the area below the disc where the nerve runs more laterally towards the foramen. Narrowing of the lateral recess is caused by **facet arthrosis**, usually in combination with hypertrophy of the **flavum ligament** and **bulging of the disc.**

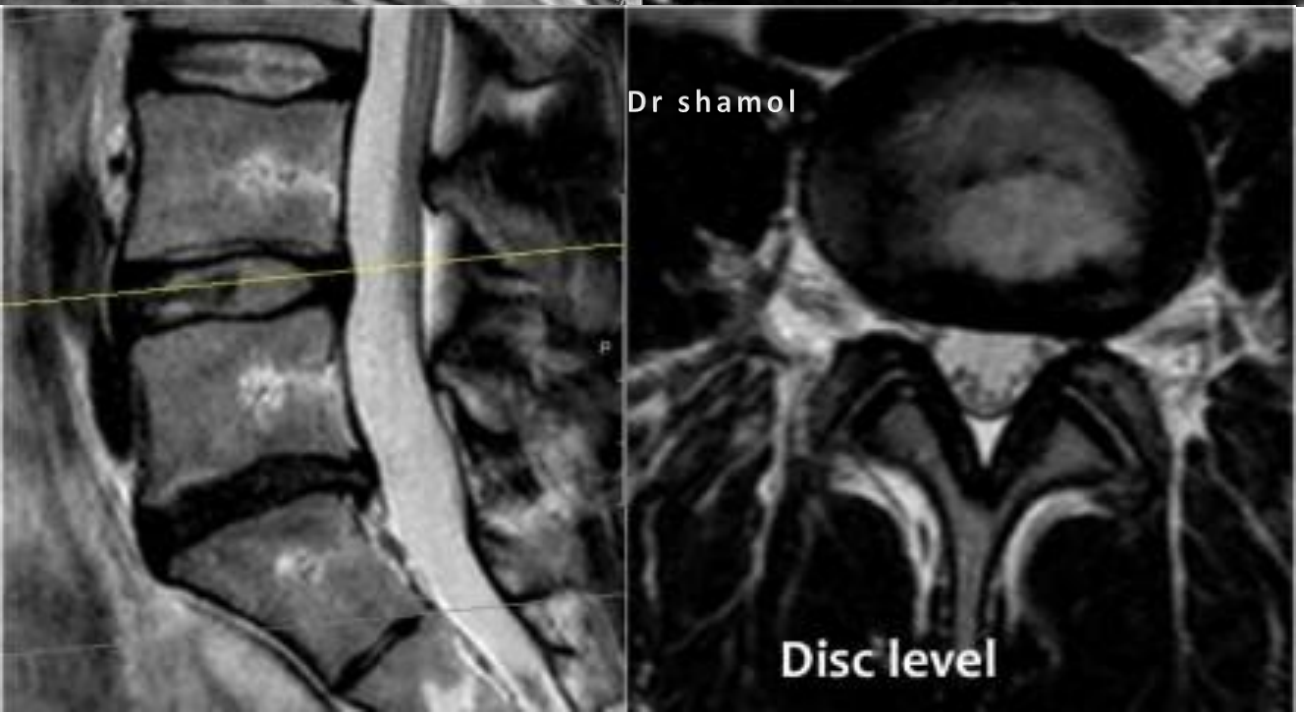
Foramen.
This is the area between two pedicles, where the nerve leaves the spinal canal.
Narrowing of the foramen is seen **in facet arthrosis, spondylolisthesis** and **foraminal disc herniation** - usually a migrated disc from a lower level

Extra-foraminal.
This is the area lateral to the foramen.
Nerve compression in this area is uncommon but may caused by a **laterally herniated disc**

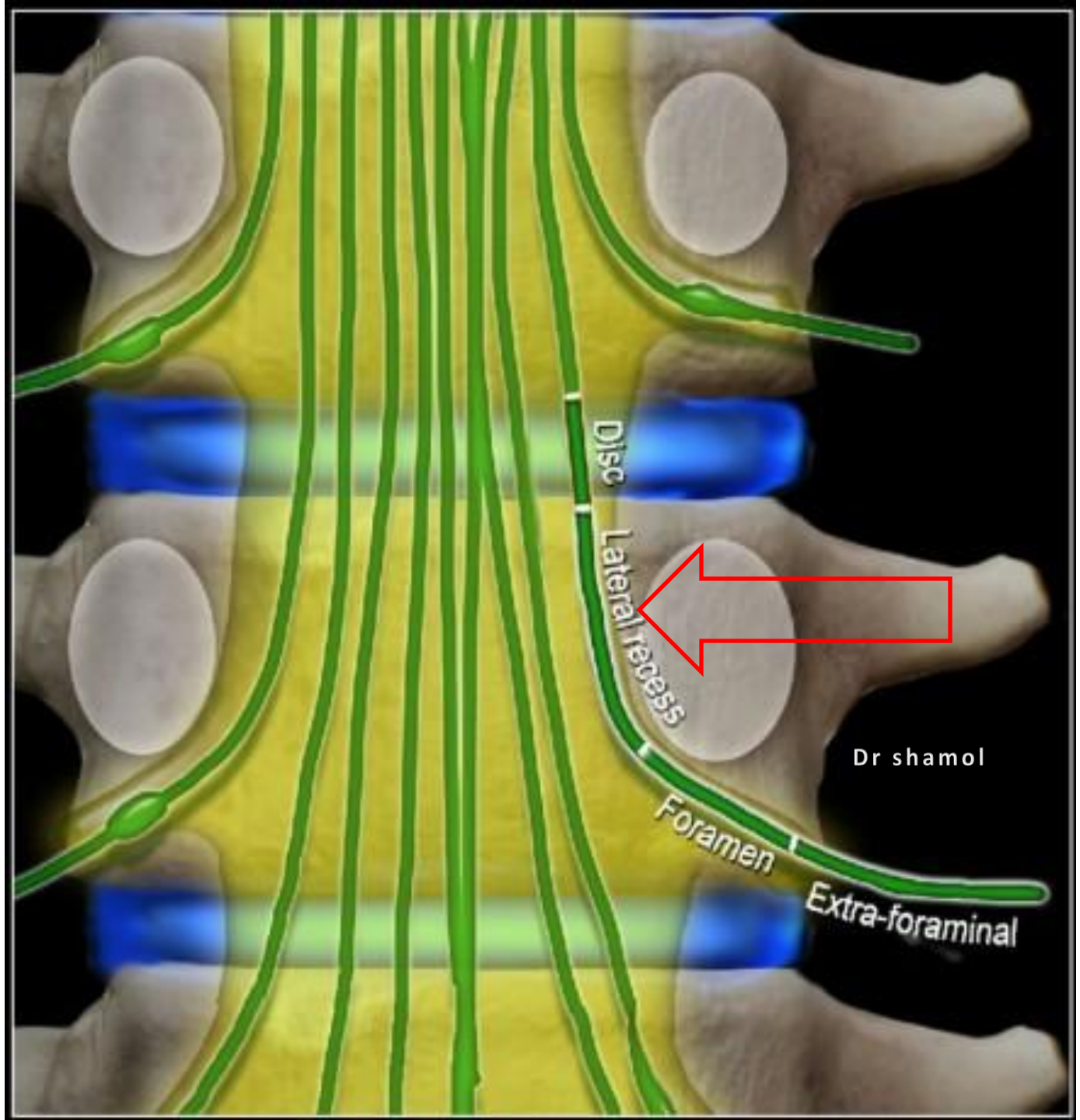
Disc level. Nerve Compression




Disc level


Dr shamol
Disc level

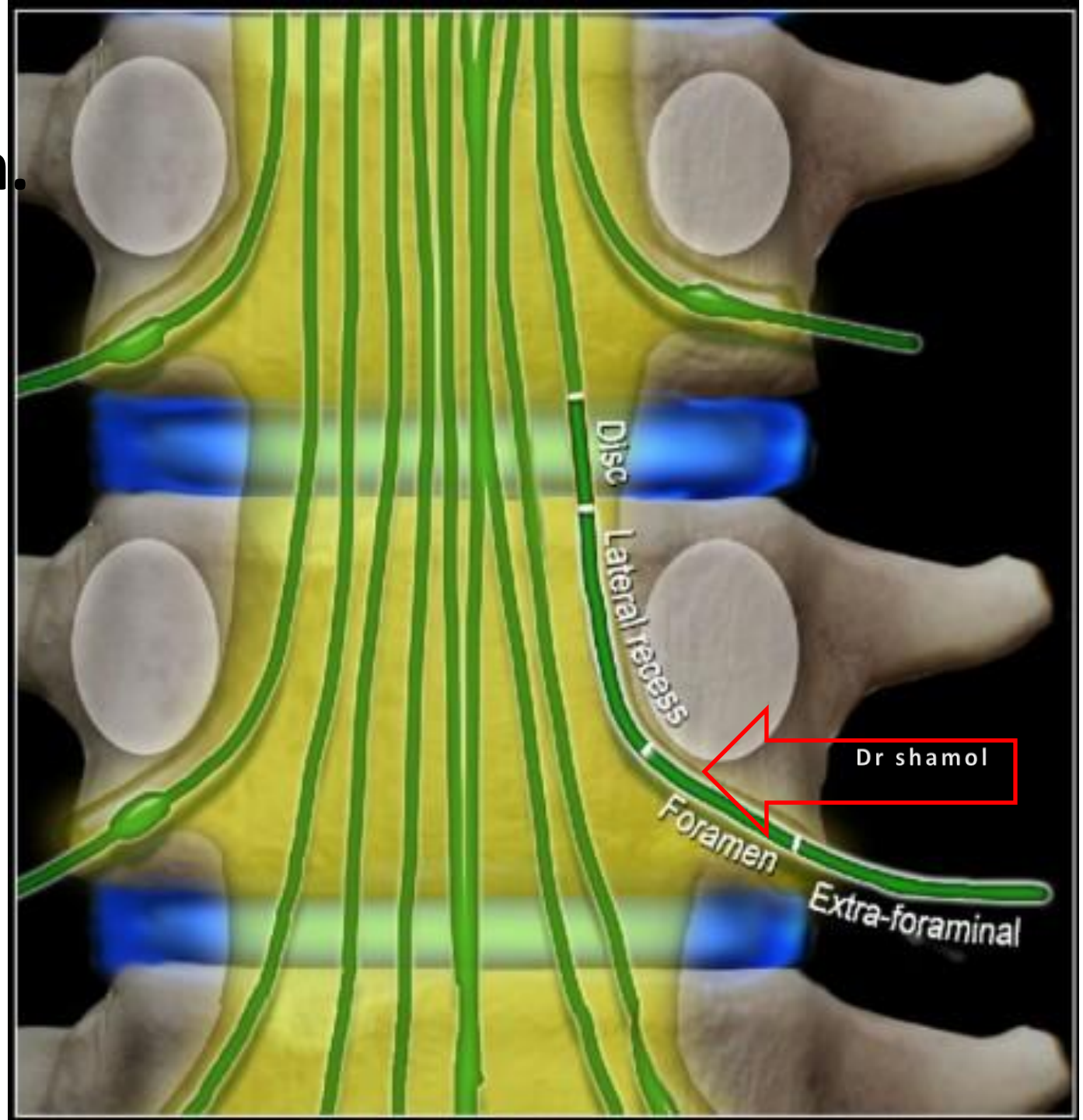
Level of lateral recess.

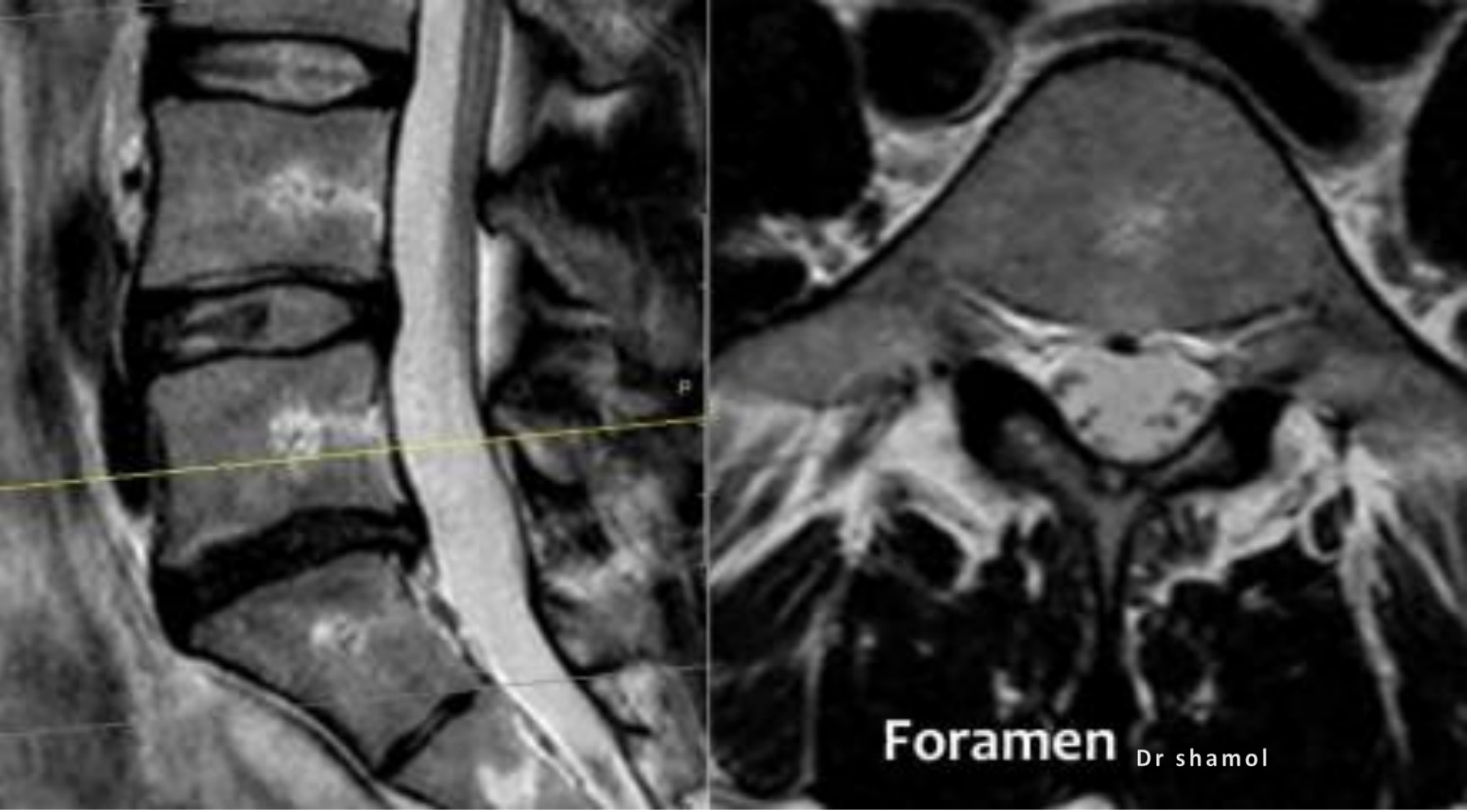


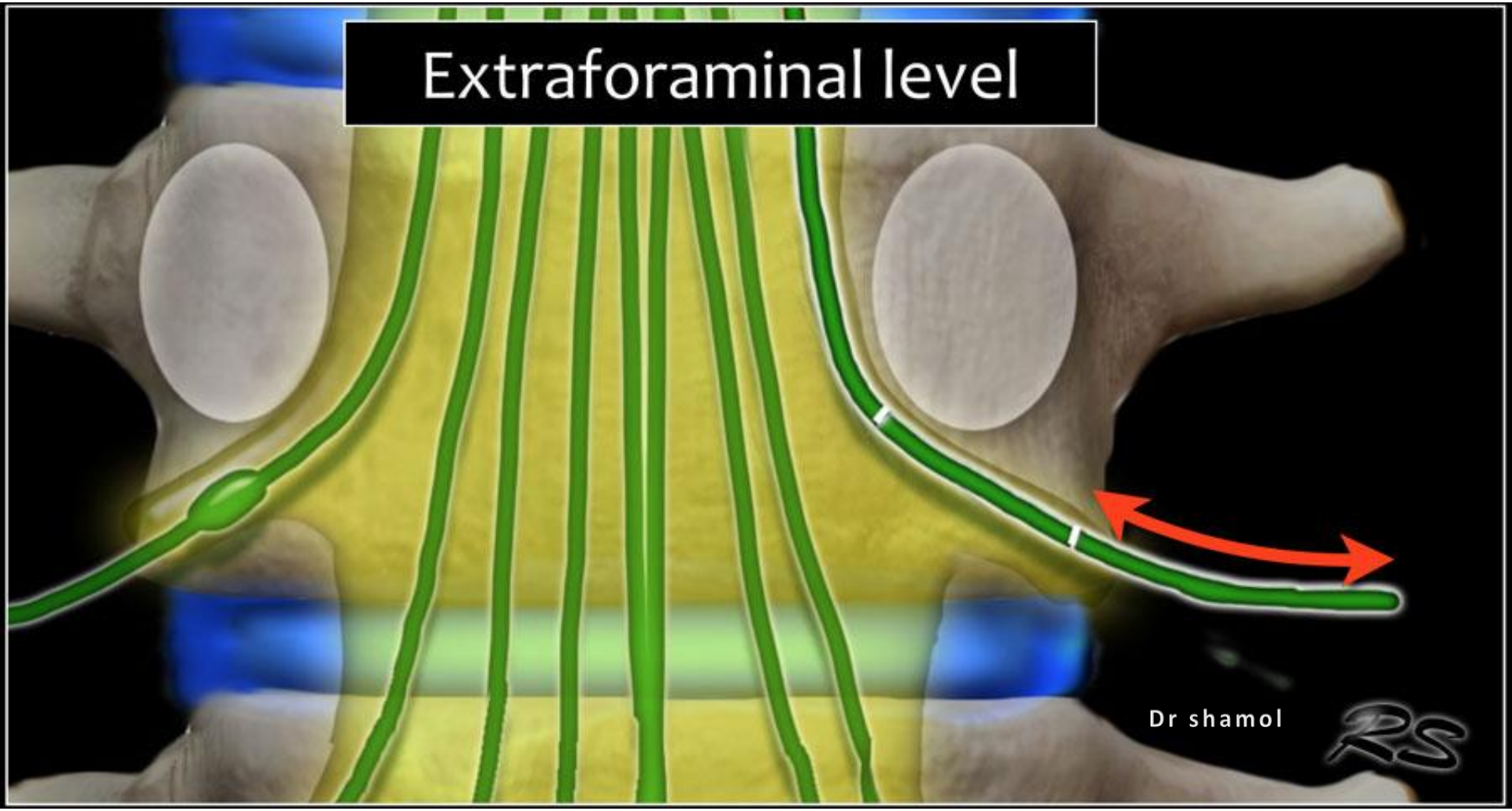

Lateral Recess

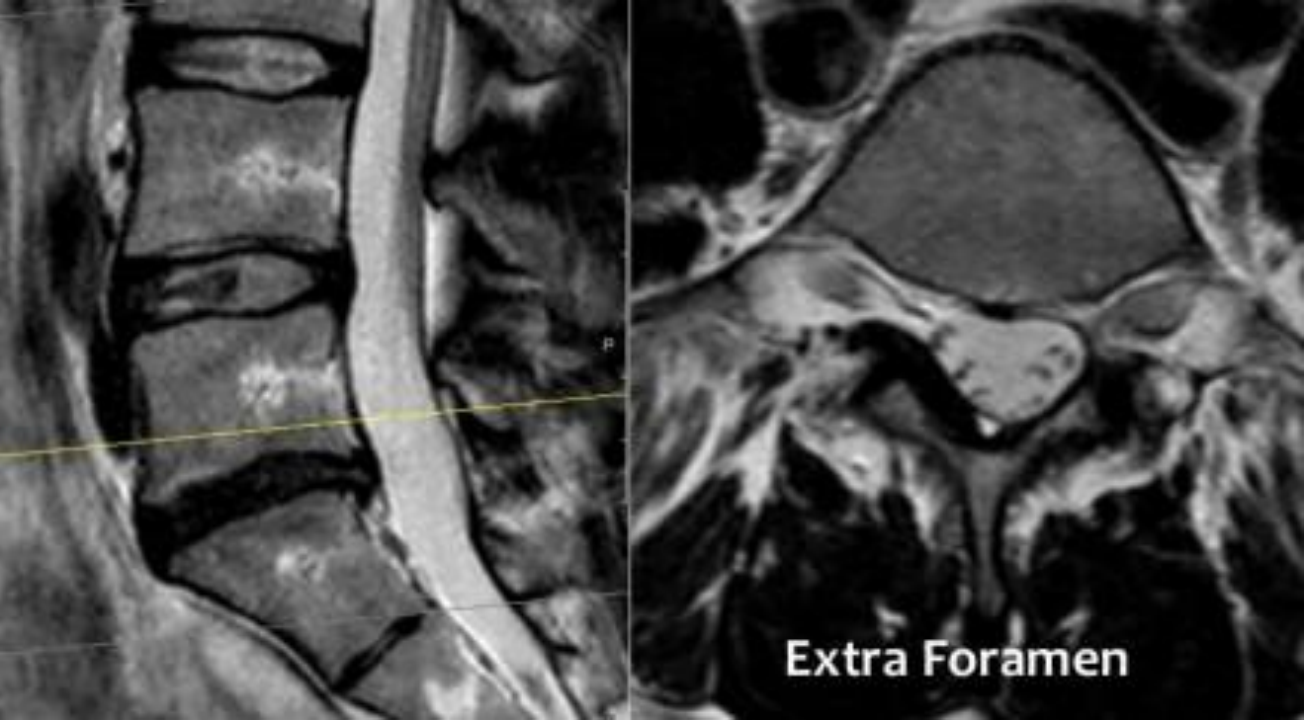

Dr shamol
Lateral Recess

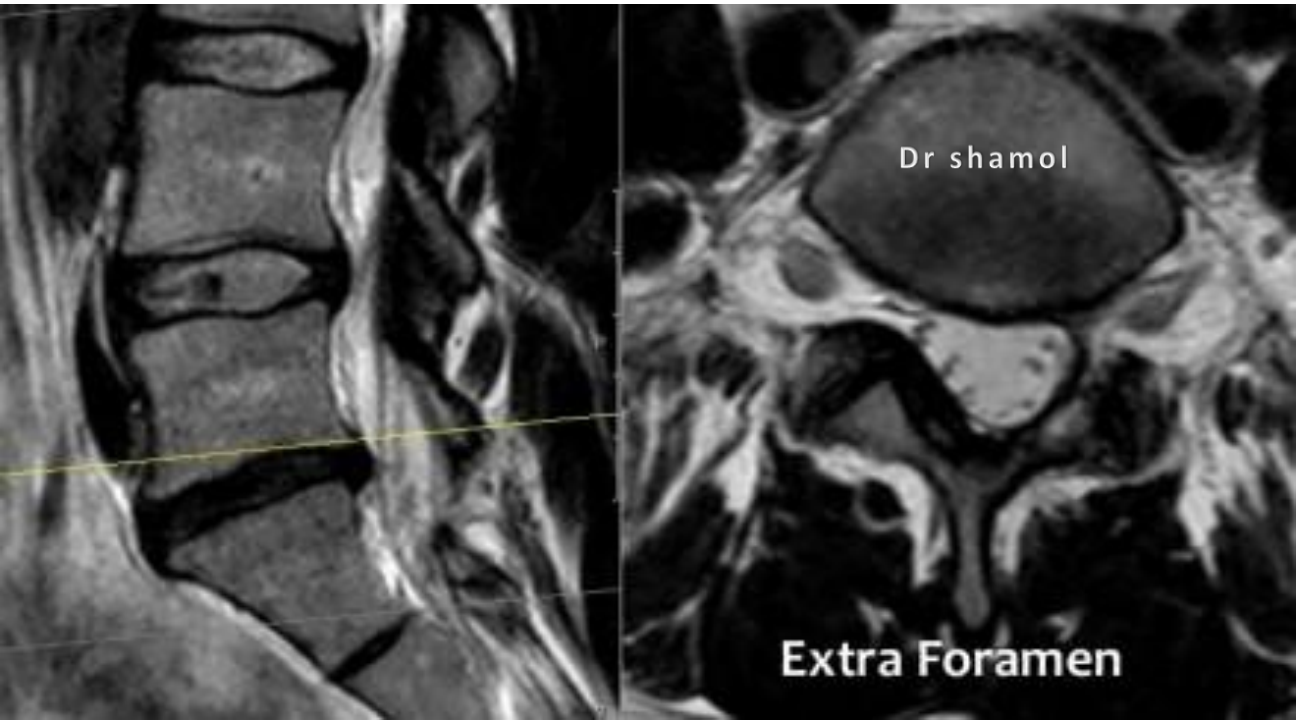
Foramen. Level

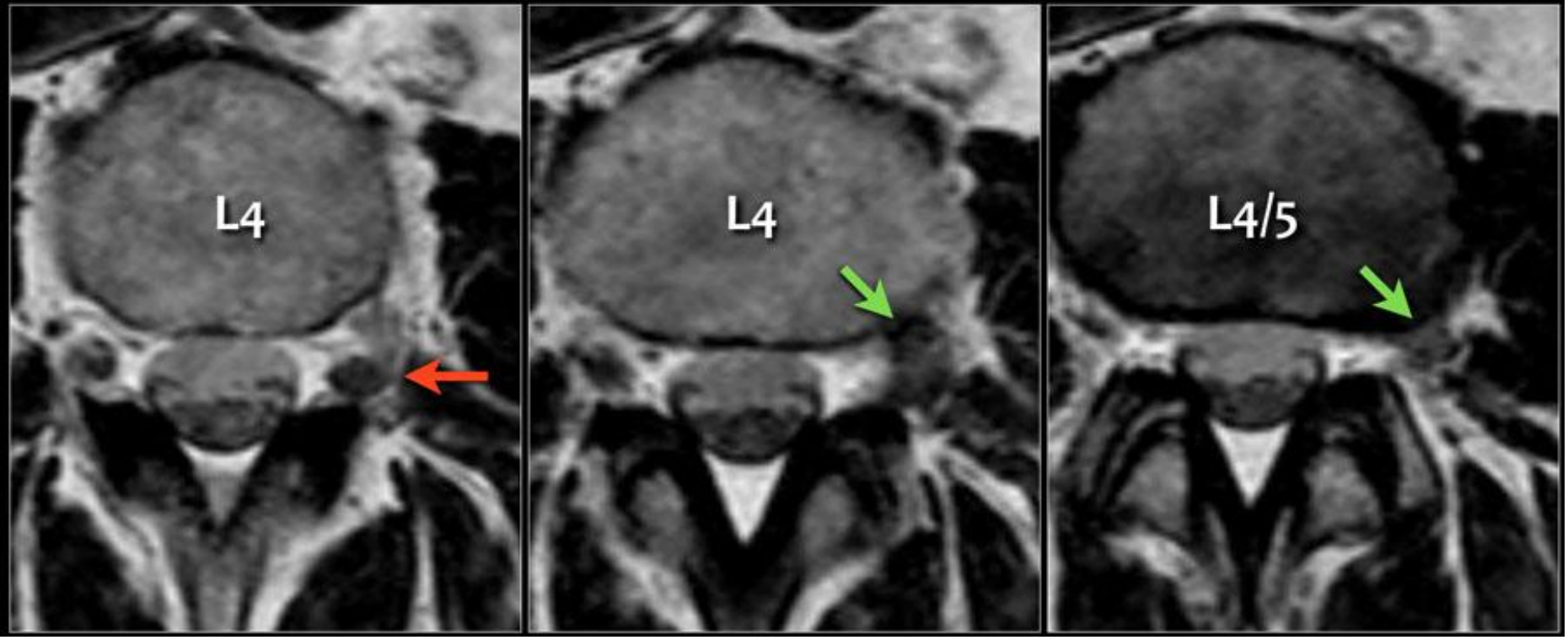



Foramen
Dr shamol

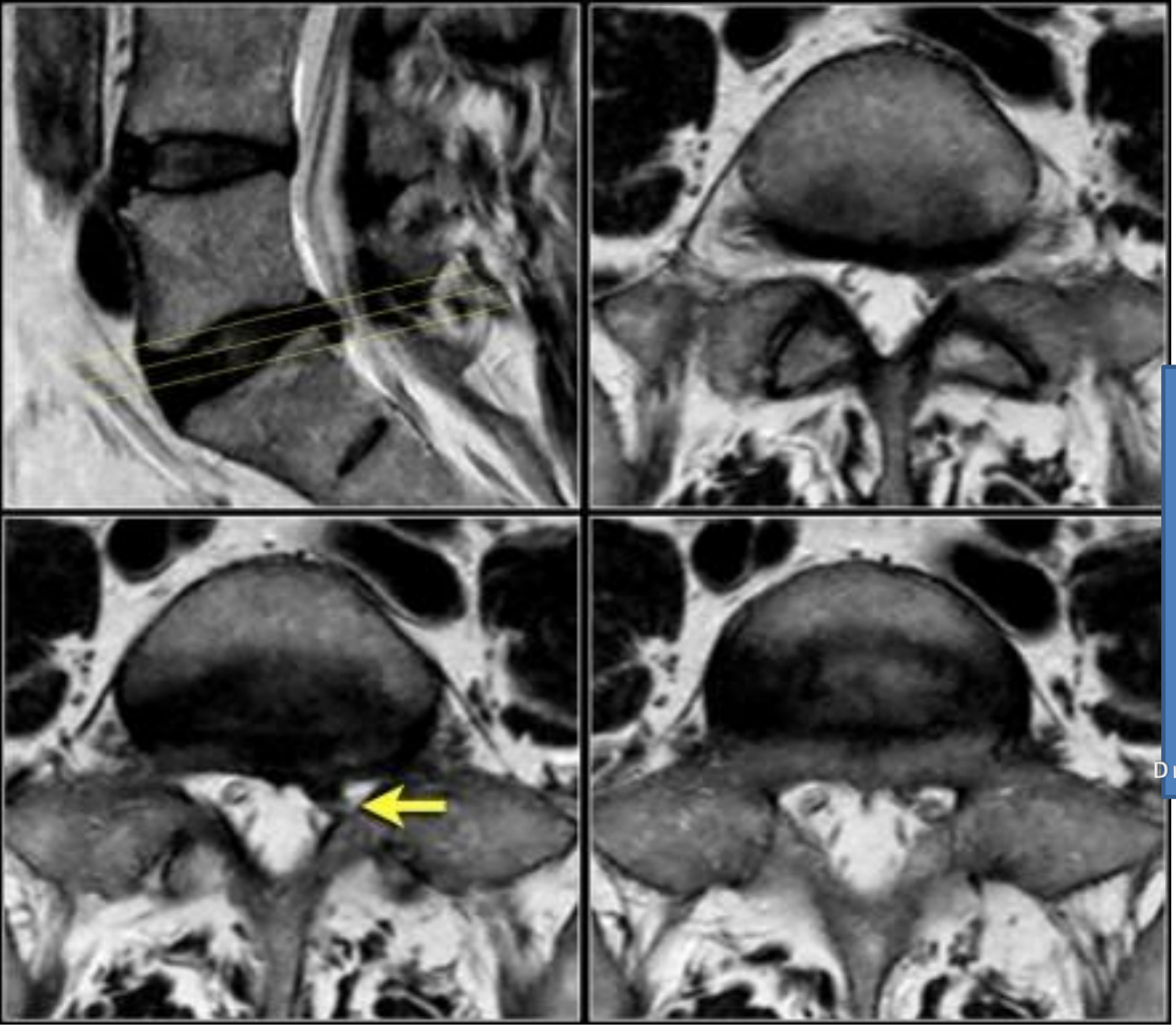

Extraforaminal level
Dr shamol
RS


Extra Foramen


Dr shamol
Extra Foramen



Here an example of a lateral disc herniation that produces compression of the superiorly exiting nerve root and ganglion.
Notice the L4 nerve (red arrow), which is being displaced posteriorly by a lateral disc herniation at the L4-5 level (green arrow).

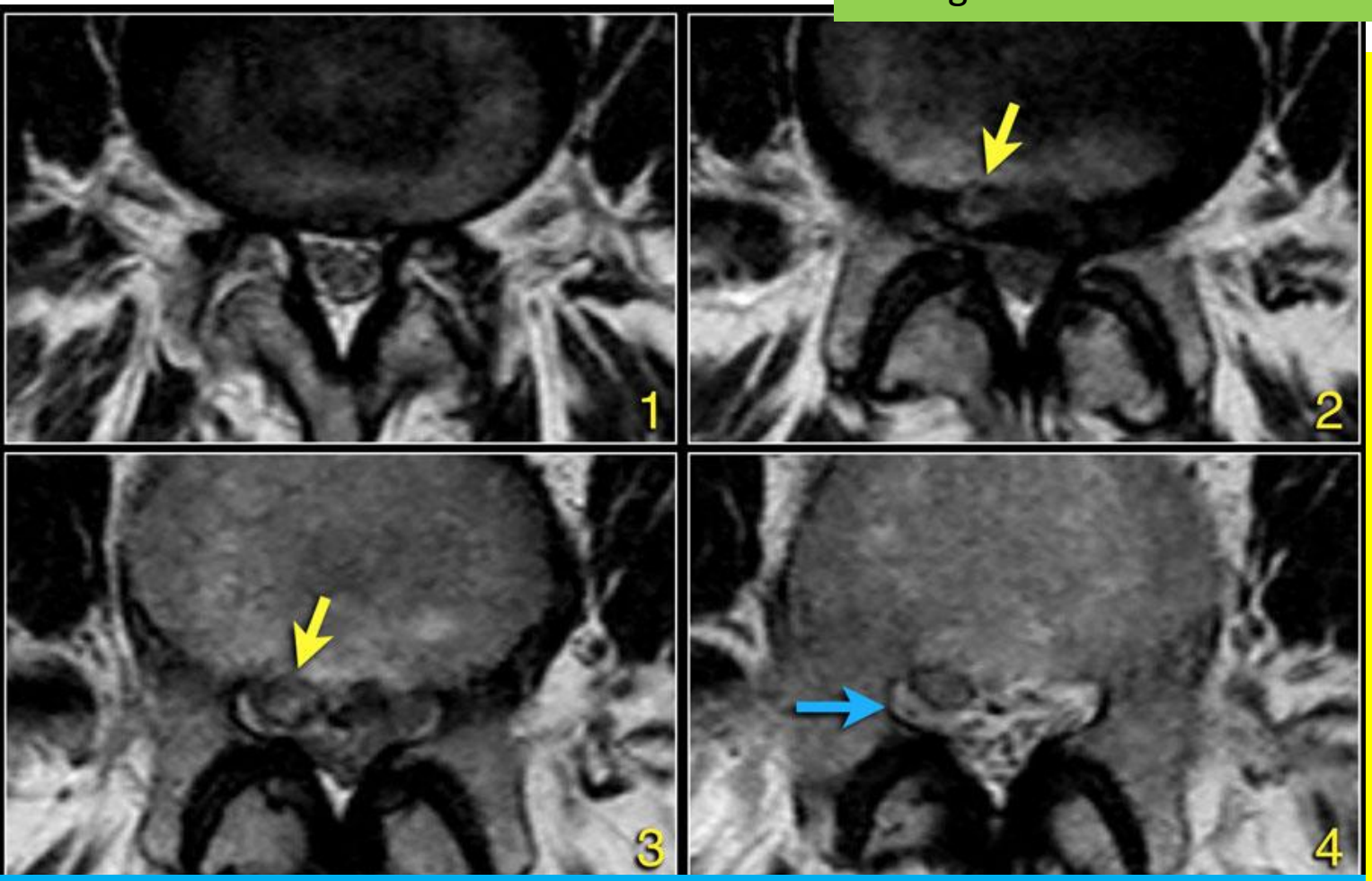


Here a focal protrusion at the L5S1 level.
The S1 nerve is compressed (arrow).

Dr shamol

1.At the level of the disc there is minimal spinal canal narrowing by bulging of the disc and facet arthrosis.

2.At this level there is severe spinal canal stenosis due to bulging disc and facet arthrosis. There is also an annular tear (high signal) through which the disc herniates (yellow arrow)



3.At the level of the lateral recess, there is a focal herniation of disc material compressing the L5 nerve (yellow arrow).This is called extrusion, because the distance between the edges of the disc material is greater than the distance at the base

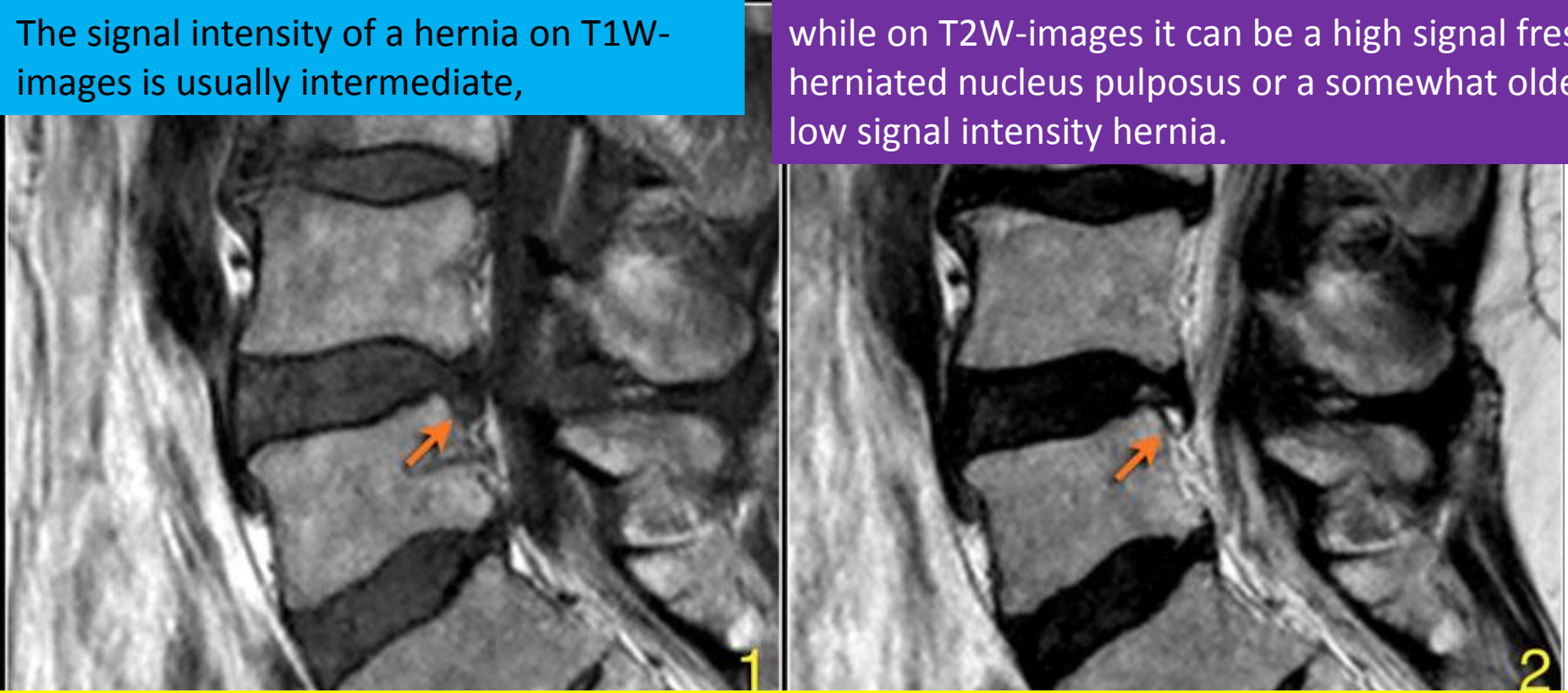
.

4Compressed L5 nerve (blue arrow) within the lateral recess.
The herniated disc has migrated caudally and is seen as an oval structure anterior to the nerve.
The herniated disc is uncontained, i.e. not covered by fibers of the annulus

Dr shamol

The signal intensity of a hernia on T1W-images is usually intermediate,

while on T2W-images it can be a high signal fresh herniated nucleus pulposus or a somewhat older low signal intensity hernia.



Here a herniation with high signal (yellow arrow on transverse images) sliding through the annular tear and compressing the left L5 nerve (blue arrow).

